

The 1st Academic Conference on the Auspicious Occasion of
His Majesty the King's 80th Birthday Anniversary:

The Importance of Telecommunications Development

by

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Introduction

In his Royal Address, His Majesty the King of Thailand said, “Development of the nation must be carried out in stages, starting with the laying of the foundation...” (Celebrations, 2007). He went on to explain that this foundation includes the proper application of fundamental principles to ensure that people have the economic and technical means to provide for their basic necessities. It is of this foundation, built with fundamental principles and economic and technical means that I address in this paper.

There are many facets to this foundation, but I will limit myself by addressing only one aspect, namely information and communications technology, or ICT, and the important role of government regulation in the sector. My examination of government regulation will focus on telecommunications.

My analysis has two basic parts. I will begin by describing how ICT is essential for developing a nation and providing economic means for the country’s people. I will describe the lessons from research and from practical experience about how ICT is essential for a country to grow, engage with the international community, and maintain its own uniqueness and character. One thing that will be clear in this discussion is that communications technologies are constantly changing and that the rate of change does not appear to be slowing. This is critical as we think about the importance of the foundation of which His Majesty spoke. As Peter Drucker once said, “It is precisely because change is constant that our foundations must be strong” (Drucker, 2004).

If change is constant and we lack adequate foundation, we will surely fail. We will fail in part because we will lose the values and the meaning that we live for. As His Majesty the King once observed, high technologies can be lifeless gadgets, but they can transform a person with spirit (Celebrations, 2007). In my opinion, we must work to ensure that we do not lose sight of why we live while pursuing better ways to live. The other reason we will fail in the absence of a strong foundation is because the development and usefulness of telecommunications depend on institutions and legal frameworks that allow competition on the merits, provide stability while also adapting to new realities, limit market power and opportunism, and overcome the information asymmetries that are

inherent in infrastructure sectors. This will be the second part of my paper: The importance of proper regulatory systems and proper regulatory policies for telecommunications. Telecom regulation should be based on a foundation of basic principles and philosophies that have proven to be true and effective around the world, transcending cultures, legal structures, and histories.

In my career at the Public Utility Research Center, I have had opportunities to engage with almost every country in the world regarding their infrastructure policies. Something that has impressed me is that people across the globe have more in common than they have differences. We admire many of the same human aspirations – giving help to those who need help, having self-control, expressing gentleness, and the like – which are qualities the King has embraced as guiding principles (Celebrations, 2007). We also fall to some of the same human frailties – greed, self-indulgence, deceit, and the like. As peoples we seek to inspire our citizens to the higher qualities – the building of character and the development of spirit – and to train ourselves to abandon those things that are base. But as essential as building the human spirit is, it has proven not to be enough, so we have also developed institutions – laws, customs, and processes – that provide incentives for good conduct. This is the basic role of regulatory institutions: providing rules and structures that permit opportunities and that provide incentives for essential infrastructure services, while limiting the prospects for exploitation and opportunism.

ICT and Development

Introduction

I will now address my first topic: How ICT impacts our lives. Imagine for a moment what life was like in Thailand 10 years ago. If we had ventured out into the streets and byways of Thailand 10 years ago and randomly selected 100 Thai citizens, only six of those 100 people would have had access to a fixed-line phone in their everyday lives. Only two would have had a mobile phone. And less than two would have encountered a personal computer. There is only a 60 percent chance that one of them

would have used the Internet. And chances are that the six persons with the fixed line phones would also have been the mobile phone users, PC users, and lone Internet user. And those with access to ICT would have been only the richest and the most powerful (International Telecommunication Union, 2006b).

That was just 10 years ago. Today, if we were to conduct this same experiment, we would find over half of the people of Thailand have a fixed line or mobile phone and that the number using the Internet had grown 25 percent every year for the past five years. We would find that the number of main telephone lines in Thailand has doubled since 1997 to over 7 million, the number of mobile phones has grown over 2,000 percent to well over 30 million, and the number of people connected to the Internet is approaching 9 million (International Telecommunication Union, 2006b). I think we would also find that growth in ICT is occurring faster in the middle class and with the poor than with the wealthy. And that these technologies are transforming lives.

ICTs and Economic Development

In examining how ICT transforms lives, I will first analyze how ICTs impact economic development. I will then examine ICTs' impacts on social development and civil engagement. Staying true to my academic roots, I begin by examining the research.

In his Presidential Address to the American Economic Association in 2001, Professor Dale Jorgenson of Harvard University observed, "The development and deployment of information technology is the foundation of the American growth resurgence" (Jorgenson, 2001). Research by Jorgenson and other prominent academicians has shown that this finding applies not just to the United States, but to almost every country of the world.

Consider a study by Lars-Hendrick Röller of Humboldt University and Len Waverman of the London Business School (Röller and Waverman, 2001). They examined how telecommunications development affected economic growth in the Organisation for Economic Co-operation and Development (OECD) countries from 1971 through 1990. Their central finding was a significant positive causal link between

telecommunications development and economic growth, especially when telecommunications infrastructure hits a critical mass, namely the level at which it has achieved nearly universal service. They found that telecommunications development was the cause for about one-third of the economic growth in these economies from 1971 through 1990, or about US\$1,700 per person per year on average, an improvement of about 10 percent in per capita gross domestic product over the base year.¹

In their paper, Röller and Waverman explain that the link between telecommunications development and economic growth is generally attributed to spillovers and externalities. That is to say, when one portion of the economy adopts telecommunications to improve its productivity, this has positive spillovers on the productivity of other portions of the economy. For example, improved methods for managing inventory lower costs for businesses, which lead to lower prices for consumers. These lower prices give consumers additional discretionary income that they can then use for savings, investing, education, or other pursuits that improve their standard of living. Furthermore, when one portion of the economy, say banking, increases its use of telecommunications, other portions of the economy also adopt the use of telecommunications so as to better work with the banking sector.

But two aspects of the Röller and Waverman (2001) study are troubling. One is that they only used data from developed countries, so their study does not tell us to what extent these lessons apply to developing countries. Furthermore, they found that the impacts occurred when nearly everyone had access to telecommunications. This is not the situation for developing countries, so we are left wondering whether we would see such dramatic results outside of the OECD countries.

Fortunately, along with Waverman, Meloria Meschi of the Law and Economics Consulting Group and Melvyn Fuss of the University of Toronto addressed these concerns in a 2005 study that focused on mobile telephony (Waverman, Meschi, and Fuss, 2005). They examined mobile phone development from 1996 through 2003 and found that it has a positive and significant impact on economic growth, and that “this

¹ From Table 1 in Röller and Waverman (2001): OECD GDP per capita in 1971 was US\$11,297 and in 1990 was US\$16,321, a difference of US\$5,093. One-third would be US\$1,698.

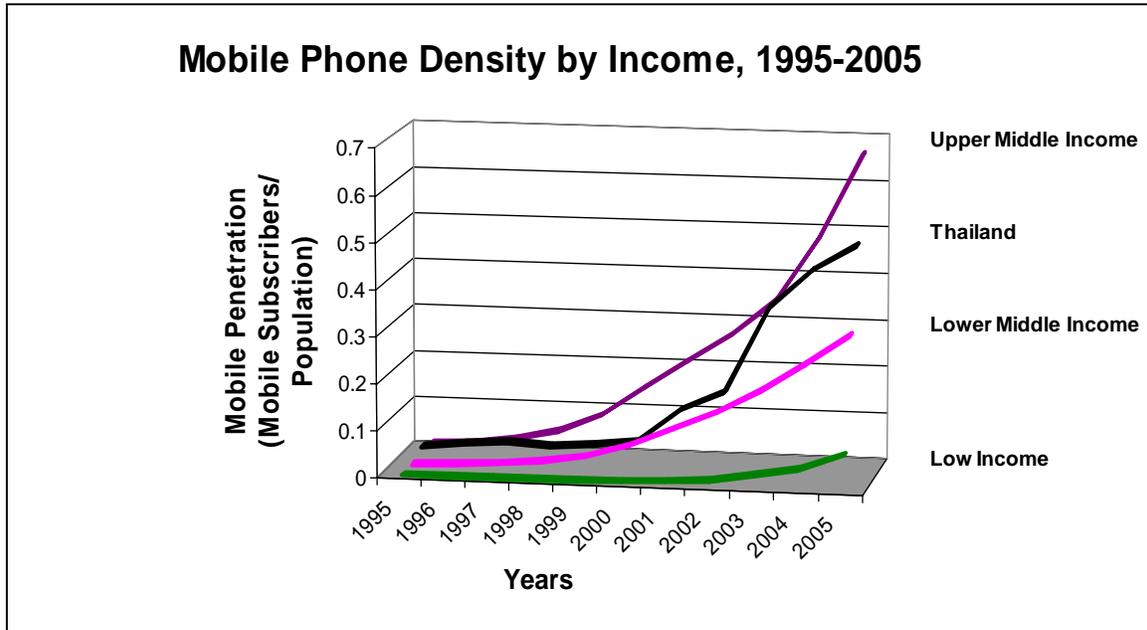
impact may be twice as large in developing countries compared to developed countries.” This is worth repeating: Mobile phone development has a significant, positive impact on economic growth, and the impact for developing countries may be twice what it is for developed countries. The authors of the study explain it this way: “A developing country that had an average of 10 more mobile phones per 100 population between 1996 and 2003 would have enjoyed per capita GDP growth that was 0.59 percent higher than an otherwise identical country.” Given that the average growth rate was 1 to 2 percent in the study, this was an impressive gain. Using the Philippines as an example, which had a mobile phone penetration rate of 27 percent in 2003, its citizens could enjoy an annual average per capita income growth that was as much as 1 percent higher than neighboring Indonesia (whose penetration rate was only 8.7 percent in 2003) “owing solely to the greater diffusion of mobile telephones, [if] this gap in mobile penetration [was] sustained for some time.”

Waverman, Meschi, and Fuss (2005) further deduced that “differences in mobile penetration between developing countries might generate significant long-run growth benefits for the mobile leaders.” Because there are significant differences in the penetration and diffusion of mobile telephony across developing countries, the study “results suggest that this gap will feed into a significant difference in their growth rates in future.”

Let us pause to consider what this might mean for Thailand. According to the International Telecommunication Union (ITU), Thailand has about 15 more mobile phones per 100 population than its peer (lower middle income) countries, defined in terms of per capita GDP. Indeed as Figure 1 shows, Thailand’s growth in mobile phones has been rapid since 2002, outpacing all but the higher income countries. This will most likely result in a rapid rise in the economic well-being of Thailand’s citizens. But as the researchers observe, this does not mean that countries with impressive records can rest on their laurels. Waverman, Meschi, and Fuss (2005) conclude that “[g]iven the speed with which mobile telecoms have spread in developing nations, it is unlikely that large gaps in penetration will persist forever...” Indeed, there is a need for effective regulatory institutions to ensure continued growth and rapid innovation into the next generation of

ICT. As the Waverman, Meschi, and Fuss (2005) analysis suggests, economic success will depend on “regulatory policies that favour competition and encourage the speediest possible rollout of mobile telephony.”

Figure 1. Mobile Phone Density by Income, 1995-2005.²



The conclusions of the Röller and Waverman (2001) and Waverman, Meschi, and Fuss (2005) studies are supported by other research. According to Chen Chimutengwende, Minister of Information, Posts and Telecommunications of Zimbabwe and Chairman of the WorldTel Assembly of Governors, “Studies conducted by (the) ITU have revealed that each new telephone line (both mobile and fixed line) in the developing world contributes approximately US\$4,500 to the gross national product... The challenges in the developing world include reducing poverty, eliminating illiteracy, and improving health services. All this can only be addressed in an environment in which communication works,” he concludes (International Telecommunication Union, 1999, 7).

² Note that Thailand is considered a lower middle income country.

How does ICT development lead to economic development? One method is by improving productivity by creating opportunities, saving costs, and improving skills. According to the International Institute for Communication and Development (IICD), ICT development provides small- and medium-sized enterprises (SMEs) with the ability to boost productivity, access international markets, and improve customer service. This has come about in part because of the drastic fall in ICT prices in the past 10 years, which has made computing, telephony, and Internet affordable for SMEs (iConnect Online, 2007b). In India, for example, mobile phones are enabling fishermen to find the most profitable market to sell their daily catch. After making their catches, the fishermen call potential buyers to check demand and prices. This opportunity to sell where demand is greatest has eliminated the waste of fish that has plagued the fishermen in the past. It has also eliminated variation in market prices, causing consumer prices to fall by 4 percent and the fishermen's profits to rise by 8 percent. ICT development resulted in what we in the United States would call a win-win: Consumers received more fish at lower prices, and the fishermen received higher incomes (Economist.com, 2007).

A similar situation is occurring in Senegal where artisan fishermen use handheld devices and mobiles to improve their efficiency: They are able to talk with buyers to learn about market prices and make deals (Batchelor et al., 2003).

These opportunities for improved productivity exist for farmers as well as fishermen, according to the International Development Research Center, which reports that fishermen and farmers using such ICT applications can on average improve their profits by 15 percent (Davis and Ochieng, 2006). For example the World Bank describes a case study where farmers in the Philippines are using ICT to go global. They have developed an Internet commerce site to publish the availability of their agricultural products to a large market (Batchelor et al., 2003). Producers upload their prices for goods via mobile phones to the Web site, eliminating the need for a computer and increasing their profitability. As rice farmer Ricardo Buenaventura explains, "This trading venue enables us to monitor prices. We no longer have to travel far, going to a marketplace or trading center to do that" (Batchelor et al., 2003).

The IICD explains that farmers' use of ICT allows them to understand market trends and market opportunities, empowering them to make the right choices (iConnecT Online, 2007b). They are able to make better informed decisions on what to grow, when to grow, when and where to sell, and at what price. Having access to information on the context within which they operate, such as relevant government policies, has a large influence on their day-to-day labor and fruits of their labor.

ICT development stimulates other types of entrepreneurial businesses. In South Africa, mobile phones have opened up opportunities for those who have not had access to traditional banking. Text messaging has allowed people to pay fees, transfer funds to relatives in other countries, and receive funds from nationals abroad (Economist.com, 2006b). Similarly in Bangladesh, women are taking advantage of Grameen loans to buy mobile phones and create small, entrepreneurial businesses (i.e., a "village phone" that allows other locals to make and receive calls). Prior to the new business ventures of these women, villagers had to make long trips into the city to conduct their affairs. The village phone businesses save villagers between 3 and 10 percent of their monthly income (Economist.com, 2001).

The Inter City Marketing Network of India brings together women entrepreneurs and women marketers in various cities to expand the entrepreneurs' market for their food products. The marketers keep in contact with the entrepreneurs via mobile phones to communicate market prices and market demand, and to transfer funds (Batchelor et al., 2003).

As these stories demonstrate, telecommunications development can improve the productivity of businesses. Lisa Correa of the University of London examined this issue for the United Kingdom (Correa, 2006). Using data from 1984-1996, she found that most industries in the United Kingdom benefited from the incorporation of advanced telecommunications technology. This had spillover effects for the economy as a whole, in no small part because of lower prices for products. This is illustrated in Table 1, which shows that investments in advanced telecommunications lowered prices for basic utilities by 4.3 percent, lowered prices for transportation services by 10.8 percent, lowered prices

for financial institutions by 27.3 percent, and not surprisingly lowered prices of telecommunication providers by 56 percent. Overall, prices in the economy were 14.1 percent lower because of the application of advanced telecommunications.

Table 1. Effects of Advanced ICT in the U.K., 1984-1996 (Correa, 2006)

Sector	Price Increase w/o Advanced ICT	Productivity Increase from Advanced ICT
Agriculture, hunting, forestry, and fishing	7.5%	22%
Mining and quarrying	2.9%	17%
Manufacturing	5.5%	31%
Electricity, gas, and water supply	4.4%	45%
Construction	8.6%	59%
Wholesale and retail trade	8.3%	--
Transport	12.1%	50%
Telecommunications	84.9%	13%
Financial intermediation	37.5%	486%
Public administration	6.9%	56%
Education and health	3.5%	42%
Other services	8.1%	98%
Total economy	16.4%	111%

In terms of productivity over the time period 1984-1996, Correa (2006) found that applying advanced telecommunications improved productivity in the manufacturing sector 31 percent, improved productivity in construction 59 percent, and improved productivity in the financial sector a dramatic 486 percent. Productivity overall improved over 100 percent. According to Correa, her “[r]esults suggest that the telecommunications productivity, over a 34-year period, has outpaced the economy-wide productivity level...[and] telecommunications was a strong contributor to the performance of the economic system as a whole. This coupled with the telecommunications productivity rate figures suggests that not only has telecommunications contributed its share of total output more efficiently, but it has also contributed to overall economy-wide productivity growth via its influence on other industries...[A]ll industries have benefited from the incorporation of advances in telecommunications technology...”

Another way that ICT development has stimulated growth is through encouraging investment. Research led largely by Jorgenson (Jorgenson, 2001; Jorgenson and Vu, 2007) shows that declines in information technology (IT) prices were key drivers in the resurgence in economic growth around the world and that greatest gains were from businesses investing in information technologies, not from changes in productivity. For example, in Jorgenson's study of 14 major economies in the world and the world's seven primary economic regions, he finds that productivity growth accounted for less than one-fifth of the total (economic growth) during 1989-1995, while investment accounted for more than four-fifths. "Similarly, investment growth contributed almost three-quarters of growth from 1995-2000 and more than three-fifths from 2000-2004" (Jorgenson and Vu, 2007). In summary, Jorgenson's and Vu's research demonstrates that IT contributes to growth primarily by transforming an economy. This transformation provides growth by stimulating investment, not only by making businesses more productive in doing the same old thing.

In summary, declining prices for ICT drive economic development through increased investment in ICT products and services, the substitution of efficient ICT for outdated technologies, and the development of new ICT-based skills by workers. I expand on this transformation of the economy in my next topic: ICTs and social development.

ICTs and Social Development

I will now consider how ICT affects society as a whole. According to InfoDev, a consortium of international development agencies, ICT projects allow residents of developing countries to come together and find new and more efficient ways to identify and rectify their community issues. These include job creation, health care, and education and training (Batchelor et al., 2003). I will examine each of these, beginning with job creation.

In Nigeria, Africa's most populated country, the telecommunications industry, and particularly the mobile industry, has been recognized as the fastest growing employer. The telecommunications regulator, the Nigerian Communications

Commission, estimated that in a single month – March 2004 – the telecom sector directly created 5,000 new jobs, primarily due to the growth in the mobile sector. In addition, spin-offs in new businesses – including dealerships, retail outlets for mobile handsets and accessories, and one-man phone booth operations – created no less than 400,000 new jobs that month (International Telecommunication Union, 2006a).

The Ugandan Rural Communication Development Fund, which is managed by the industry regulator, the Uganda Communications Commission, is expanding telecommunications to unreached rural areas, which in turn is facilitating the rise of entrepreneurship in these areas. Through micro-loans and grants, entrepreneurs have the opportunity to set up public payphones in their communities. This allows their community to reach the outside world, decreasing costs of obtaining information, as well as stimulating economic profits for the owner of the payphone (Dymond and Oestmann, 2002). My friends in Uganda tell me that rural telecommunications development has also allowed families to stay together. As is true for many countries, young people in Uganda are moving from the rural areas to the cities in search of employment. Without rural telecommunications, these new urban workers would be unable to stay in contact with their parents, aunts, and uncles, who have stayed in the rural areas. Telecommunications is helping ensure the continuation of these important social networks.

ICT expansion in Nepal is improving living standards of the rural population. The government is implementing 1,500 e-centers throughout the country. These centers will create jobs and allow for the dissemination of information applicable to socioeconomic activities of the community (The Rising Nepal, 2007).

In addition to creating jobs, ICTs can improve the health sector. According to the IICD, “They can help by collecting and transferring data on patterns and trends of diseases and related health measures; disseminating key health messages to the general public; facilitating the management of services by increasing efficiency in the handling of day-to-day data and information necessary for planning, budgeting, and programming; allowing health workers to communicate with each other, share important knowledge, and access medical journals and reports from around the world; and allowing health

workers in remote locations to have access to the knowledge and experience of doctors in urban hospitals” (iConnecT Online, 2007a). There are numerous examples where the IICD’s observations have proven true.

Cape Town, South Africa has one of the highest incidences of tuberculosis in the world. The recovery rate of victims is low due to the fact that tuberculosis patients must adhere to strict regimens that they do not follow simply because they forget. The City Council of Cape Town decided to make use of the ever-growing presence of cell phones to address this problem: The city sends out medical text message reminders to tuberculosis patients. In the program’s pilot, out of its 139 patients, 138 patients were successful in adhering to the medical regimens, which led to their recovery. If fully implemented, this could lead to a significant overall increase in the recovery rate of tuberculosis patients in Cape Town (bridges.org, 2003).

This approach might be useful in other situations. As is well-known, one of the obstacles to treating AIDs in Africa is that HIV-positive patients have difficulty following the complex medicine regimens needed to combat the virus. Perhaps mobile phones can be part of the solution: Medical professionals could notify patients about what medications to take and when to take them.

As another example of how ICT can improve health care, the Bayan Loco Community Center of Kafanchan, Nigeria has created a tele-center, aimed at providing community members with access to health education materials. This has improved the health of the citizenry and, as a side benefit, computer literacy has increased, which has in turn created job opportunities (Batchelor et al., 2003).

As the Bayan Loco example illustrates, ICT development also promotes education and training. In Thailand the King’s establishment of the Distance Learning Foundation to commemorate the auspicious occasion of the 50th Anniversary of His Majesty’s Accession to the Throne is an example of how ICT can improve education and training. As the King has rightly observed, “Lifelong education will benefit individuals and the country as a whole,” and “Real education not only gives learners knowledge, but also the ability to distinguish virtue from vice, and right from wrong, to drive away ignorance”

(Celebrations, 2007). Initiatives such as the Distance Learning Foundation can lower the cost of education and promote the distribution of the best educational resources throughout the population.

Many countries are increasing education and training through the development of ICT. The Omar Dengo Foundation in Costa Rica works with the government to provide computer-based learning environments to rural and low-income areas of the country, beginning with primary schools. This has resulted not only in education in traditional subjects, but in ICT skill development for students and teachers (Warnock et al., 2005). In the United States, my 16-year-old son has taken courses from the Florida Virtual School, an online education program that allows students to complete courses that they cannot fit into their busy school day.

At the University of Florida's Warrington College of Business Administration students can earn an undergraduate degree in business without stepping foot on campus. The business school also has one of the world's most successful Internet-based MBA programs. Course work is offered electronically through e-mail, Web browsers, bulletin boards, synchronous group discussion software, asynchronous class presentation software, video and audio streaming using iPods, and interactive CD-ROM technology (University of Florida Warrington College of Business Administration, 2007).

Recently the Public Utility Research Center collaborated with the University of Toulouse, the Pontificia Universidad Católica in Peru, the World Bank, and a panel of international experts to launch an online Body of Knowledge on Utility Regulation. Designed to bring case studies, basic knowledge, and the best thinking on infrastructure policy to regulatory professionals around the world, this site is used by universities and training centers internationally for courses and for individual study.³

The use of ICT for education has also stimulated training in ICT. In Brazil, children in low-income areas are given computer training, and then the training facility sets them up with their first job. Primary schools in Botswana are implementing

³ See www.regulationbodyofknowledge.org. Funding for this project came from the Public-Private Infrastructure Advisory Facility (PPIAF).

technology into the curriculum in order to increase the skill sets of children and, in the long-run, make them more competitive in the labor market (Batchelor et al., 2003).

Civic Engagement and Equity

Having examined how ICT development affects economic and social development, I will now turn my attention to how ICT impacts civic engagement. Ten years ago, when I visited Uganda for the first time, I interviewed the government official in charge of managing national elections. If you are familiar with Africa, you know that elections are frequently controversial and violent, and that accusations of corruption are the norm. This official was rightly worried about how he would manage upcoming presidential elections. The country had experienced a violent political past and the continuation of the country's then decade-long peace in part rested on his shoulders. As he saw it, one key to his success would be transferring voter results quickly and securely from the rural areas and other parts of Uganda to the capital, Kampala, before fraud could occur. At the time I interviewed him, the official was completing plans for using wireless data networks to transmit election results quickly and securely to election headquarters, an innovation made possible by telecommunications liberalization.

Uganda's neighbors, Kenya and Ghana, followed a similar path: They now use mobile technology to prevent electoral fraud by calling in election results before activists have the chance to stuff ballots. This lends to political stability and decreased corruption, which are important for foreign investment and economic development (Economist.com, 2006a).

Of course, using ICT for elections is not a panacea. As Florida and other jurisdictions in the United States have learned, ICT must be managed carefully to ensure transparency, legitimacy, and credibility for the government; themes to which we will return later.

Managing elections is only one way that ICT can help improve government. In Colombia, a telecommunications service provider improves citizen involvement in community and national affairs by offering access to information concerning human

rights, living conditions, and gender and environmental concerns to local organizations (Batchelor et al., 2003). As *The Economist* observed, mobiles can be a tool of “empowerment,” even in the poorest and worst-governed parts of the world. “The cruder kinds of electoral fraud, relying on poor communications between the capital and the boondocks, are now much harder” (Economist.com, 2006a).

In the context of the growing importance of ICTs, in 2003 the Commission on the Status of Women discussed and adopted recommendations on women and ICT. It recognized that if existing gender disparities in access to and use of ICT were identified and eliminated, ICT could be a powerful catalyst for eliminating gender-based disparities (Hannan, 2007). The use of Grameen loans by women in Bangladesh is one example of how ICT creates opportunities for women where, in other times, such opportunities did not exist. Brazil is another example, where women use Internet radio to voice their perspectives on issues pertaining to community development (Batchelor et al., 2003).

Conclusions Regarding ICT and Development

So as we have seen, ICTs play a greater role in economic development than any other sector in the economy. ICT has been responsible for one-third of the growth in developed countries, and its impact in developing countries is even greater, perhaps twice as great as that in the OECD nations. Its impacts have come from increased productivity and stimulated investments. And while we do not have studies that show the differential impact between the well-to-do and the poor, the anecdotal evidence indicates that the poor have the most to gain and perhaps are the most innovative in finding ways to use ICT to make their lives better. The opportunities for trade, education, health care, and civic involvement created by ICT development provide the poorest among us prospects that no amount of charity alone can provide.

But I have only established that the ICT sector is central to development and improvement of people’s lives. I have not yet described the preconditions for ICT development. Indeed, for many of us some of these preconditions have proven to be counterintuitive. When I first became involved in the economic regulation of telecommunications in 1984, my intentions were that I would work for the liberalization

of monopoly telecommunications markets. I believed that competition would provide better results for customers than would monopolies. I am happy to say that research emerging over the past 20 years has confirmed my belief: Competition is essential to the effective development of ICT. I am also happy to say that significant progress has been made in liberalizing telecommunications markets. However, I also believed in 1984 that, once competition was in place and working, my role as an economic regulator would be over. On this I was mistaken. I was surprised to discover that in sectors such as telecommunications, where infrastructure requires large investments, where scarce resources can be monopolized, and where interdependencies among service providers create opportunities for anticompetitive conduct, that the role of economic regulation is every bit as important when there is competition as when there is monopoly, perhaps even more important. These are the issues that I will address next.

Importance of Proper Regulation

Introduction

Let me return to something His Majesty said in his Royal Address: “Development of the nation must be carried out in stages, starting with the laying of the foundation...” (Celebrations, 2007). Having explored how telecommunications is an important part of the foundation for a country’s development, I will now consider how regulation is a necessary part of the foundation for telecommunications.

I will describe how the development and usefulness of telecommunications depend on institutions and legal frameworks that allow competition on the merits, provide stability while also adapting to new realities, limit market power and opportunism, and overcome the information asymmetries that are inherent in infrastructure sectors. I will then describe the essential instruments of regulation; how regulation is part of a larger system of policy making that makes it possible for customers to receive the efficient telecommunications services that they desire; and the challenges for creating, maintaining, and adapting the regulatory system.

Reasons for Regulation

Let me begin now to consider the reasons for regulation. It seems fair to say that the purpose of telecommunications regulation is to improve sector performance relative to no regulation. What do I mean by improved performance? Infrastructure industries, such as telecommunications, are imbued with the public interest, as Professor Martin Glaeser said over 80 years ago, and as I explained previously: The welfare of the rest of the economy is dependent on the telecommunications sector operating efficiently, providing adequate service at low prices, and innovating at a pace that allows the population to succeed in a competitive global economy. This tells us precisely what we should mean by improved sector performance, namely that we should want a sector that is (1) technically efficient, meaning that the sector should be world class in terms of operating at least cost; (2) efficient in how it affects the allocation of the resources in the economy, meaning that cost efficiencies should be passed along to customers in the form of low prices and that service prices should reflect service costs; and (3) dynamically efficient, meaning that the sector should be world class in terms of the advanced services made available to customers (Glaeser, 1927, 171).

There could be any number of obstacles that keep the sector from performing well. Foreign trade restrictions could limit access to new technologies, efficient management practices, and business synergies. A lack of skilled labor could limit technical efficiency. Hyperinflation could make planning difficult and ineffective. These are economy-wide problems, so solving them is best handled within that broader context.

In contrast, telecommunications regulation is designed to address problems specific to infrastructure sectors, namely issues of market power and market stability, opportunism, and limited information. Unchecked, these problems will keep the telecommunications sector from being an efficient engine of development. I describe each of these problems next and then examine how regulation addresses the problems.

The first problem is that of market power, which is the ability of a service provider to raise prices by limiting the amount of service supplied to customers. Low output and high prices prevent telecommunications growth. Numerous studies have

shown that market power limits development. Waverman, Meschi, and Fuss (2005) found that competition was a key regulatory policy for developing mobile telecommunications. In his study of telecommunications development in Latin America, one of our graduate students, Louis Gutiérrez (2003), found that “opening of the market to more competition and the free entry of private investors in basic telecommunications services will propel network expansion and efficiency across the sector.” In his study of telecommunications competition in developing countries, Scott Wallsten of the AEI-Brookings Center (2004) found that protecting incumbents from competition results in “a significant decrease in the incumbent’s investment in the telecommunications network, payphones, mobile telephone penetration, and international calling.” In their study of broadband in the United States, Aron and Burnstein (2003) found that competition between telecom companies and cable television companies is the most effective catalyst for increased broadband penetration. Gruber and Denni (2005) reached the same conclusion two years later, but they also found that the resale of a telecom company’s broadband service can increase penetration in the early stages of competition.

If competition is so beneficial to telecommunications development, why do operators resist competition? In my experience working with the telecommunications sector, I have never heard an operator say that it wanted to harm the economy by charging high prices and limiting supply. However, I have never witnessed an operator not exercise its market power when given the opportunity. Why would a telecommunications provider do this? The reason is that absent effective regulation, the operator is better off exercising market power than being an effective engine of economic growth. Exercising market power is attractive to a profit-oriented service provider because it provides monopoly profits to investors and high wages to workers. Market power is also attractive to a politically oriented service provider, such as a state-owned operator, because it allows the operator to manage markets to gain political support. Both the profit-oriented manager and the politically oriented manager can rationalize their exercise of market power, but the negative consequences for the economy are the same: Absent regulation restricting the use of market power, the service provider’s self-interest keeps it from serving the public’s interests.

Market power can come about in several ways. It might occur because the government restricts entry, because operators enter into collusive agreements, because there are significant scale economies, or because demand is thin. Historically, government restrictions played the largest role. This was the case in the United States where AT&T argued in the 1920s that the nation should be served by a single network, operated largely by AT&T. The government basically agreed and allowed AT&T's re-monopolization of the country's telecommunications system (Brock, 1981). This appeared reasonable at the time because competition in the sector was often destructive or at best unstable. Indeed in the 1920s, the industry was just completing a time of what might be described as cutthroat competition where rivals vandalized each other's facilities, refused to interconnect networks, and, in some instances, sabotaged access to capital markets (Mueller, 1993 and Gabel, 1994). These kinds of actions are being repeated today in many parts of the world. This instability was unacceptable for such a critical industry, so the government's choice of a stable monopoly was understandable. However, we now know that regulation can solve these problems.

The effects of competition and regulation on telecommunications development have been evident in Thailand. Referring back to Figure 1, which compares Thailand's mobile growth to that of other countries, the surge in mobile development in Thailand correlates with the development of competition and the work of the National Telecommunications Commission (NTC) of Thailand.

Indonesia provides an example of issues created by market power. In 1967, the government and the company ITT entered into a 20-year agreement wherein ITT was given exclusive control over the installation and management of international telecommunications in Indonesia. ITT was given minimum tariffs, but there were no upper limits on tariffs or on profits. Twelve years into the 20-year agreement, a dispute arose between the Indonesian government and ITT over the laying of an additional cable between Medan and Penang. The government wanted ITT to install the cable, but the company refused claiming that the cable was uneconomical. The government faced a dilemma: Should it honor its exclusive contract with ITT and do without the cable, or should the government break its contract? In 1980, the government chose to break the

contract and nationalized the operations of international telecommunications. Arguably ITT's refusal was simply an exercise of market power: The operator had an exclusive right to serve and, with no upper limit on prices, had little incentive to expand output. This exercise of market power made it attractive for the government to break its commitment (Wells and Gleason, 1995).

This takes us to the second problem regulation is designed to address, namely, that of opportunism, or the difficulty of making and keeping commitments. Opportunism occurs in infrastructure services when, once a utility has sunk its investment, the government expropriates the value of that investment by, for example, lowering prices to non-compensatory levels, clawing back profits, or making new demands.

Consider the example of utility reforms in the United Kingdom. The Thatcher government was one of the first in the world to privatize state-owned monopolies. Because privatization and regulation were new outside the United States, there was significant uncertainty about how the government would treat the utilities after privatization. This made investors cautious and unwilling to pay premium prices for the utility assets. As it turned out the regulatory system was successful, and investors received high profits, arguably as reward for the uncertainty and risks they bore. But the profits attracted criticism from the press and from the political opposition. As a consequence, when the Labour Party came into power, it implemented a windfall profits tax of sorts that clawed back the investors' profits. This was opportunistic behavior on the part of the Labour government, which led some investors to withdraw from the U.K. market. This had a spillover effect to other countries: Based on my discussions with operators, it appears that some became less willing to invest in developing countries' infrastructure sectors because, if the U.K. government could not be trusted to keep its promises, then perhaps other governments could not be trusted as well (Ifs.org, 2000; Jamison, 2002).

Why is opportunism more of a problem for infrastructure businesses than for other types of businesses? Professor Pablo Spiller (2005) of the University of California at Berkeley studied this issue and identified three reasons why utility industries are

especially vulnerable to opportunism. The first reason is that the technologies are characterized by large, sunk investments that are specific to the purpose of providing the utility service. This makes the utility vulnerable to opportunism because the utility cannot easily reverse its investment if the government does not live up to its commitments. Returning to the U.K. example, the utility investors could not pack up their electric distribution lines, gas pipelines, etc. and leave. Nor could they simply use the facilities for something else. They were totally dependent on the government's willingness to keep its commitments. The second reason why infrastructure industries are especially vulnerable to opportunism is that their technologies have economies of scale and scope. This makes expropriation economical for the government because it has only one or a small number of operators to deal with. The last reason why utilities are vulnerable is that their products are consumed by large portions of the population. This massive consumption makes the services politically sensitive, so politicians can gain short-term political advantage by expropriating rents from service providers.

Why should a country care about limiting opportunism? Research has consistently shown that regulatory institutions that cause governments to keep commitments encourage investment. For example, in their study of electricity generation, Cubbin and Stern (2006) found that both regulatory law and higher quality regulatory governance are positively and significantly associated with higher per capita investment because regulations stood in the way of political opportunism. The researchers also found that the positive impact of regulation increased over time, as the regulatory agencies became more experienced and developed positive reputations. Research by Professor Thomas Lyons of the University of Michigan also demonstrated that when regulators build reputations for keeping commitments, service providers are more willing to make investments and expand output (Lyon and Li, 2003). Likewise Gutiérrez (2003) found that in Latin America, "Sound regulatory governance in telecommunications has a positive impact on network expansion and efficiency." For their study, Cubbin and Stern (2006) concluded that, "An effective institutional framework is essential to sustain growth in output, efficiency, and capacity for commercialized utility service industries, such as electricity, telecommunications, and water, particularly if they have significant private investment (physical or financial)."

Cubbin and Stern's (2006) finding that opportunism affects privately owned operators more than state-owned enterprises makes sense, but we should not conclude that opportunism only applies to the private sector. Indeed, in their study of water systems in Latin America, Savedoff and Spiller (1999) found that government-owned operators were also often victims of opportunism. For the government-owned operator, short-term political pressures often lead to budgetary restrictions with the promise that money will be forthcoming when the political pressures ease. Unfortunately, the promised budgetary relief rarely arrives. In some instances, the restrictions directly limit investment. In other situations, the knowledge that money will not be available for system maintenance leads managers to limit their political exposure by restricting the scale of their operations.

This is not to say that governments cannot rationalize or justify opportunistic behavior – as we saw in the case of Indonesia – but the long-term effects are rarely positive. Exceptions would include some Caribbean countries that chose to end exclusivity contracts with Cable & Wireless, knowing that the benefits of competition outweighed the costs of not keeping commitments. To its credit, Cable & Wireless understood the situations and was willing to negotiate with the Caribbean governments. Furthermore, operators can behave opportunistically as well. When Latin America experienced currency crises in the late 1990s, utility operators insisted on renegotiating their concession agreements. Several countries did so, and the countries with strong regulatory institutions were most able to resist service provider demands (Basanes, et al., 1999).

The third problem that telecommunications regulation is designed to address is information asymmetry, or the situation where the operator knows more about its ability to operate efficiently than does the government. There are basically two types of information asymmetries. One type, called adverse selection, occurs when the operator has a particular set of abilities to be efficient, produce high-quality services, and the like, and the government does not fully know these abilities. The other type, called moral hazard, occurs when the government cannot observe the amount of effort the operator is putting forth to be efficient, produce quality, etc. With both types of information

asymmetries, an expert regulator that provides economic incentives and interacts dynamically with the operator, observing what the operator accomplishes under different circumstances, is able to overcome some of these asymmetries and induce the operator to use its remaining hidden information for the benefit of customers.

The importance of economic incentives and expertise to overcome information asymmetries has been examined extensively in economic theory. Researchers from the University of Florida empirically demonstrated the importance for telecommunications in their studies of incentive regulation in the United States (Ai and Sappington, 2002; Ai, et al., 2004). They found that incentive regulation, which is a form of regulation that allows operators to keep extra profits when they lower prices or improve services for customers, leads to greater innovation, lower costs, and improved service quality over traditional forms of regulation.

One consequence of information asymmetries is that the government might be overly generous with operators. This occurred in the United States before the development of substantial regulatory agencies: Elected officials would set limits on utility prices. Because the officials were not experts, the utility had the negotiating advantage, and the price limits were so high that the operators would voluntarily charge prices that were far below the restrictions. This was of course embarrassing for the politicians and called into question the legitimacy of the franchise agreements (Glaeser, 1927). A similar embarrassment occurred in the United Kingdom when the newly formed electricity regulator conducted its first price review in the 1980s. A price review is a formal process by which the regulator thoroughly examines an operator's prices and establishes basic pricing restrictions that are to be in place for several years. The newly formed U.K. electricity regulator did not recognize its information disadvantage and so badly underestimated the electric distribution companies' abilities to lower costs. As a result, when the regulator announced its plans for new price restrictions, investors were thrilled, and stock prices for the companies skyrocketed (Lee, 2001).

Of course, operators can overlay their information advantage. Recently in Barbados, the incumbent operator, Cable & Wireless, asked for price changes. The

operator essentially refused to provide adequate information to justify the proposed prices, and the regulator rejected the case (Fair Trading Commission Barbados, 2004). In the state of Washington in the United States in the early 1990s the regulator asked the incumbent telephone operator, US West, to provide cost information to support the company's price proposals. The company refused to provide acceptable information and, as a result, the regulator developed its own cost measurement model and used it to make a decision that was adverse to the company (Jamison, 2002).

Instruments of Regulation

Having described the problems of market power and market instability, opportunism, and information asymmetries that regulation is designed to address, I will now turn my attention to the instruments of regulation.

There are four basic instruments that have proven to be effective for resolving the problems just described: subjecting operators to competitive pressures, gathering information on operators and markets, applying incentive regulation, and developing independent agencies that operate in a transparent manner and under the law. Countries typically use some combination of these approaches, and the proper mix depends on the country's needs and objectives, institutional capabilities and arrangements, and the like. As the early researchers on opportunism and regulation, Brian Levy and Pablo Spiller, stated "The success of a regulatory system depends on how well it fits with a country's prevailing institutions. If a country lacks the requisite institutions or erects a regulatory system that is incompatible with its institutional endowment, efforts at (reform) may end in disappointment, recrimination, and the resurgence of demands for renationalization" (Levy and Spiller, 1994, 242).

Competition

One of the most critical instruments for regulation today is competition. I have already cited research that demonstrates the importance of competition in telecommunications development. As explained on the Body of Knowledge on Utility Regulation Web site,

When operators are subject to competitive pressures, two things happen that [benefit customers]...The first development is that the operator, in its pursuit of profits, has an incentive to provide service quality levels and price levels that are best for customers, subject to the operator's need to cover its costs. Competition can provide this result because fully informed customers will buy only from those operators that provide the most beneficial combinations of quality and price...Even if the operator in a competitive market is state owned, competition presses the operator to act as a privately owned operator because the state-owned operator must be responsive to customers in order to finance its operations [and maintain its political support], unless the operator can use its status as a state-owned service provider to [disadvantage] rivals...The second result of subjecting the operator to competitive pressure is that competitive market outcomes reveal actual customer demand, the operator's innate ability to be efficient, and how much effort the operator is willing to exert to be efficient.

Research following the introduction of competition in telecommunications in the United States (Peoples, 1985; Bailey, 1986) demonstrates how competition forces operators to operate efficiently. Studies found that in the long distance telecommunications industry, many of the productivity gains that had occurred during the monopoly era had not resulted in lower prices, but had simply been absorbed by higher wages. It wasn't until there was competition beginning in the 1980s that this inefficiency became clear, and AT&T lowered its costs. As Professor Elizabeth Bailey (1986) of the University of Pennsylvania observed, between 1982 and 1984, "AT&T shed 6% of its work force. In July 1984, for the first time in its history, AT&T announced a freeze on the salary structure of all of its managers – a move that affected 114,000 employees." A month later, AT&T eliminated 11,000 positions, and one year later AT&T eliminated 24,000 more jobs. According to Bailey (1986), a consultant study found that prior to these cost reductions, AT&T was so inefficient that it had only "four workers for each AT&T manager, compared with a 9-to-1 ratio at major competitors." AT&T's costs for installation and maintenance were \$61 per hour in early 1984, "compared with \$33 for nonregulated competitor IBM, and \$28 for new competitor MCI."

The key issues in telecommunications for subjecting operators to competitive pressures include removing licensing restrictions and other barriers to entry, lowering fixed licensing fees, making it easier for customers to change service providers, and requiring access to essential inputs, such as telephone numbering resources and in some cases unbundled local lines. Another key issue is interconnection pricing, which represents the prices that networks charge each other for exchanging traffic. Interconnection is important for three reasons. The first reason is that when competition is new, dominant firms can exclude fledgling rivals from the market by denying or delaying interconnection, charging high fees to their rivals, or providing low quality connections (Laffont and Tirole, 2000, 184). AT&T tried to deny interconnection to MCI in the early days of competition in the United States, and when AT&T failed in that tactic, the company tried to charge interconnection fees to MCI that were higher than AT&T's own retail prices against which MCI had to compete (Brock, 1981, 227-228). In Nigeria, rival mobile networks disconnect each others' networks, in part in an attempt to lead customers to believe that the rival networks are unreliable.

Another reason that interconnection pricing is so important is that, even if competitors are equal, each network still has an incentive to raise fees to its rival networks in an attempt to gain market share by raising rivals' costs. In certain instances, this can even lead to retail prices at the monopoly level. Note that the networks do not need to overtly or even consciously collude for this to happen: All each needs to do is act in its own best interest and seek to gain customers by disadvantaging its rivals (Laffont and Tirole, 2000, 184).

The third reason that regulation of interconnection is important is that strategic interests, intense rivalry, and the degree of technical detail are so great in network interconnection that network operators rarely successfully negotiate interconnection agreements without regulatory intervention. The regulator alternatively plays the role of referee, dispute arbitrator, technical advisor, and market regulator, depending on the situation. Without regulation, interconnection disputes can drag on for some time, as they did in New Zealand, ultimately making competition largely ineffective and perhaps impossible. Only in rare instances has interconnection gone smoothly without regulatory

intervention. One such case is the country of Guatemala, where the markets were greatly underserved, and rivals needed each other to profitably grow the market.

Regulatory agencies can resolve interconnection disputes because the agencies offer a unique combination of political neutrality, technical expertise, and dependability under the law. In instances where politics became involved in the interconnection dispute, competition has faltered. In one Latin American country, the communications minister announced a set of interconnection prices after meeting with one of the operators, even though all of the operators had reached a negotiated agreement. In another Latin American country the politically connected incumbent stalled resolution of interconnection disputes to such an extent that the problem became the subject of international trade controversies. In both instances, competition suffered because entrants limited their investments in the countries in order to limit their exposure to political interference.

Another critical issue in competition is the regulation of retail prices. In some jurisdictions – Florida is an example – the government has continued to regulate retail prices despite competition, and incumbents have been unable to adequately respond to competition. This is the price rebalancing issue that has plagued numerous countries because of the political sensitivities of local line rental prices. As markets become competitive, it is important to deregulate retail prices so that there is less opportunity for collusion and so that operators can find price structures that best suit customers.

Competition does not mean deregulation of all aspects of telecommunications. I have already described several instances – for example, interconnection – where regulation plays an important role in ensuring that competitive markets work. This need for regulation even in the presence of competition has been born out in numerous research studies. For example, Maiorano and Stern (2007) found that the establishment of a separate regulator, especially in developing countries, results in the long-run in about 11 percent higher mobile penetration. Furthermore, consistent with the Röller and Waverman (2001) and Waverman, Meschi, and Fuss (2005) studies, Maiorano and Stern

(2007) found “a sizeable and strongly significant impact of mobile telecoms infrastructure on per capita GDP” for developing countries.

The Independent Agency

I will now turn my attention to the issue of the regulatory institution. It is important to ensure that the actions of the government and the regulator match the long-term interests of the country’s citizens. As the Body of Knowledge on Utility Regulation indicates, “It may be tempting, for example, for politicians to pressure the regulator to pursue short-term political interests that hurt the longer-term interests of customers of the utility services. To overcome such problems to the extent possible, countries adopt rules for regulation and government institutions that encourage regulation under the law, as well as independence, transparency, predictability, legitimacy, and credibility of the regulatory system, to help ensure that regulation serves the long-term interests of the country.”

I have already cited numerous empirical studies that have demonstrated the importance of an independent regulatory agency. All of the studies I have ever reviewed on the issue have found that an independent regulator improves sector performance. For example, Maiorano and Stern (2007) found that “the existence of an autonomous infrastructure industry regulator increases penetration rates for mobile telecommunications in developing countries.” Examining 147 countries from 1960-1994, Henisz and Zelner (2001a) concluded that checks and balances on executive discretion, in part through an independent regulator, enhance the rate of telecommunications infrastructure deployment. This was particularly true for developing countries because “[p]rospective investors in the telecommunications sector...realize that a low penetration level relative to the level of economic development in a country may not signify untapped market potential, but rather a large risk of expropriation by the state.” In their study of responses to the Asian financial crisis of 1997, Henisz and Zelner (2001b) demonstrated “the importance of institutions that support credible government commitments to infrastructure investment.” Focusing on “the development of private power provision in four ASEAN countries: Thailand, the Philippines, Malaysia, and Indonesia,” they found

that “the level of institutional support for private property rights in Thailand and the Philippines [was] considerably greater than that in Malaysia and Indonesia...[Furthermore,] despite the differences in strategies meant to align governance with the institutional environment, investors in Thailand and the Philippines fared considerably better following the crisis than did investors in Malaysia and Indonesia.”

An important feature of the regulatory agency is its ability to gather information and knowledge. This is done in at least four ways. First and foremost, regulatory agencies obtain critical data from operators. Such data include financial information, market performance, and operating statistics. This information is necessary for assessing competition, identifying and understanding trends, and regulating service quality, interconnection, radio spectrum, and the like. Sometimes politicians make the mistake of adopting laws that provide the regulator with too little information-gathering power. This is one of the worst mistakes that can be made because an uninformed regulator is likely to make poor decisions, which would limit industry performance for customers.

Another way that regulators gain knowledge is through research. In my experience, the most effective and successful regulators are those who are also thought leaders. So it is important that regulatory agencies provide their staff with time, resources, and incentives to research emerging issues and become the next generation of international experts.

Regulators also gain knowledge through education and experience. In this regard, the NTC in Thailand is to be commended as it has invested resources in ensuring that its members and staff receive training from the world’s leading experts, engage in international programs so that they learn from other countries’ experiences, and involve staff in important and substantive debates so that they gain important experience.

Leadership in Regulation

Let me now turn to my final point, namely, that the regulator’s role is a perilous one. As you may have noticed throughout my presentation, the job of the regulator is to constrain others from doing things they want to do and, in many instances, believe they

should do: The regulator removes market power, something that nearly all businesses eagerly seek; the regulator forces operators to give up their information advantage, which they believe they rightly own; and the regulator limits political discretion of the very politicians who create the regulatory agency. In my paper “Leadership and the Independent Regulator” (Jamison, 2007) I explain the problem this way:

Being an independent regulator or taking steps to become one is perilous work for at least three reasons. In the first instance, there will be some people who have to give up things they value with the development and exercise of regulatory independence. A politician stands to lose political power, an operator may lose opportunities to apply political pressure, and some consumers may lose the means to gain favorable treatment. Those who experience a loss because of regulatory independence may attack what they believe to be the source of the problem, the regulator. The second reason independence has risks is that in developing and refining independence, the regulator becomes a player, which compromises the very independence he or she is trying create or practice. Lastly, regulation has perils because the regulator plays a central role in a complex system that develops and implements policies, but the regulator has only limited authority over this system. As a result, politicians may use the regulator as a scapegoat for ineffective or unpopular policies, or for policies that are difficult to explain to the public.

Regulators face leadership challenges because the development and practice of regulatory independence create adaptive challenges for politicians and stakeholders. Independence does not mean that the regulator answers to no one: The regulator is governed by laws, political realities, transparency requirements, public sentiments, budgets, and the like. Such oversight of the regulator addresses important trade-offs between independence and accountability, between certainty and flexibility, and between long-term goals and short-term goals. This oversight is desirable because it ensures that the regulator is not simply following a personal agenda.

How can a regulator not only survive but also thrive in an environment where its job is to limit the powers of government and the actions of powerful stakeholders? The magnitude of this effort is beyond the scope of my presentation, so I will mention only a few key concepts. One important activity is to keep the reality of regulation and its challenges in front of the stakeholders. The executive director of the Uganda Communications Commission did this by hosting international programs that involved service providers, ministry, and others (Jamison, 2007). Some regulators have their staff write important research papers that bring to light issues that others might want to keep hidden. For example, a staff member of the U.S. Federal Communications Commission wrote a paper demonstrating the wastefulness of existing spectrum allocations. The data he brought to light showed politicians and the public the value they were missing because of inefficient spectrum policies.⁴

The regulator must also develop a broad perspective – in other words, get on the balcony – to see what is happening beyond the day-to-day experiences. Regulators do this by engaging in regular discussions with those who might oppose what the regulator is doing, in addition to those who might be supportive. Regulators also do this by engaging in international forums, sponsoring seminars and workshops, and the like.

I could go on to describe other essential leadership practices, such as comprehending political context and keeping debates hot enough for progress to be made, but not so hot as to derail the system. But these are lengthy presentations themselves, so they will have to wait for another time.

Conclusions Regarding Regulation

As we have seen today, telecommunications is an essential part of a strong foundation for development. Furthermore, proper regulation is a necessary part of the foundation for telecommunications development. Independent regulatory agencies, operating transparently and under the law, provide confidence to investors and citizens that the regulatory process is credible, legitimate, and predictable. In general, the

⁴ Presentation by Howard Shelanski at the “PURC Basic Methods in Radio Spectrum Planning and Management,” Cha-Um, Thailand, August 20, 2007.

regulatory institution must remain at arm's length with private interests, the political branches of government, and other stakeholders. But regulatory agencies are not autonomous: They are held accountable by having transparency, operating under the law, and being subject to an independent judiciary.

The challenges before each of us are great, but if we continue to work towards the human aspirations we all admire – giving help to those who need help, having self-control, expressing gentleness, and the like – and use these to develop the strong institutions that provide incentives for good conduct, we will experience the success our countries need.

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