Financing Information and Communication Infrastructure Needs in the Developing World: Public and Private Roles

DRAFT FOR DISCUSSION

February 2005

The World Bank

Global Information and Communication Technologies Department

Acknowledgements

This paper is based on the World Bank's Contribution to the World Summit on the Information Society Task Force on Financing ICT. The paper is a product of the World Bank Infrastructure Vice Presidency-funded Economic and Sector Work "Financing ICT." Vice President - Kathy Sierra; Sector Director - Mohsen Khalil; Sector Manager - Pierre Guislain; Task Manager - Charles Kenny; Peer Reviewers - Christine Qiang and Peter Smith. The paper was prepared by a team composed of Rym Keramane, Charles Kenny, Isabel Neto and Eric Crabtree. The team was overseen and advised by Mohsen Khalil, Stephanie von Friedeburg and Pierre Guislain. The team benefited from the output of a GICT workshop on financing instruments for ICT and comments received both at concept and draft review meetings. The team is also grateful for comments and suggestions from Axel Baeumler, David Satola and Bjorn Wellenius. The paper was edited and designed by Mark Wahl.

For comments and questions, please contact Charles Kenny, Senior Economist, Global ICT Department (ckenny@worldbank.org).

Acronyms

EAP	East Asia and Pacific
EBRD	European Bank for Reconstruction and Development
ECA	Eastern Europe and Central Asia
ERR	Economic Rate of Return
FDI	Foreign Direct Investment
FRR	Financial Rate of Return
GATS	General Agreement on Trade in Services
GDP	Gross Domestic Product
IADB	Inter-American Development Bank
ICI	Information and Communication Infrastructure
ICT	Information and Communication Technologies
IFI	International Financial Institution
ITU	International Telecommunications Union
LAC	Latin America and the Caribbean
MDB	Multilateral Development Bank
MENA	Middle East and North Africa
MIGA	Multilateral Investment Guarantee Agency
OECD	Organization for Economic Cooperation and Development
OECS	Organization of Eastern Caribbean Status
PPI	Private Participation in Infrastructure
PPIAF	Private Participation Infrastructure Advisory Facility
PTO	Public Telecommunications Operator
SAR	South Asia
SSA	Sub-Saharan Africa
WTO	World Trade Organization

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Preface

Two competing assumptions regarding the build-out of information and communications infrastructure (ICI) in developing countries are that 'the private sector alone is enough' and 'the government must take the lead role.' In fact, these notions present a false dichotomy. The private sector and governments both have crucial roles to play in ensuring that a growing percentage of the population of the developing world can access the tools of modern communications.

This report makes clear that private-sector led growth has revolutionized access to telecommunications services around the world over the past ten years, with every region of the developing world benefiting in terms of investment and rollout. At the same time, without government reform and oversight, such a revolution would have been impossible. Furthermore, the report shows that there is more to be done to ensure that poor and remote populations are not excluded from all access, and that governments, enterprises, civil society, and workers in developing countries can affordably access the more advanced ICI services that are increasingly important to doing business in a globalizing world.

Looking forward, the report proposes strategies that governments can carry out to attract private investment and ensure the continued evolution and spread of information and communications infrastructure. These strategies encompass more than sector policy alone, for investment decisions are based on a wide range of factors including, for example, the roles played by financial sector development and the broader investment environment. The strategies also include potential public sector investments that can catalyze ICI rollout in subsectors where it is not evident that the private sector is prepared to intervene on its own.

In turn, these activities can be supported by a range of donor-provided investment and technical assistance vehicles, which are laid out in the text and in the accompanying report *The World Bank Group Financial Instruments and their contribution to the Information and Communication Technologies landscape*.

The World Bank Group fully recognizes the relevance of modern information and communications services to poverty alleviation and sustainable development. In this respect, it stands ready to continue and increase its support to client countries in developing the ICI sector through a number of instruments including grants, loans, guarantees, investments, and advisory services. These instruments span both the public and private sector, and can be used together to support the public-private partnerships that will underpin the rollout of information and communications infrastructure across the developing world.

Mohsen Khalil
Director, Global Information and Communications Technology Department
The World Bank Group

Executive Summary

There has been a massive rollout of basic ICI in the 1990s. Africa, for example, saw more than a fivefold increase in teledensity. Particularly heartening has been an extension of access to previously unserved populations, with half of the world's households having a fixed connection, and the mobile footprint covering as much as 77 percent of the world's population.

The picture is more mixed for advanced ICI . While every developing region apart from South Asia has an Internet usage base proportional to its GDP or better, the number of Internet hosts and broadband subscribers, as well as international bandwidth, lags behind income share across the developing world. The numbers are even more stark in per capita terms—for example, Africa sees perhaps one Internet user per 100 people. Africa-U.S. bandwidth is less than one three hundredth of Europe-US bandwidth, despite Africa's trade flows to the U.S. being greater than 10 percent of Europe-U.S. flows.

Advance to date has been due to new technologies, declining costs, and considerable investment. The introduction of mobile technology has dramatically reduced the per subscriber costs of telecommunications services. Even fixed line switching costs, that have dropped slower than many other prices in the sector, have halved over the past decade. Over the same period, telecommunications investment in the developing world has more than doubled.

A growing share of that investment is private. Investment in telecommunications infrastructure projects with private participation is estimated to have topped US$210 billion in the developing world over the 1992 to 2002 period. Sixty-six developing countries attracted private telecommunications investment over that period worth more than 5 percent of GDP—this includes 14 countries in sub-Saharan Africa. While there has been a recent downturn in North-South foreign direct investment (FDI) flows in telecommunications, continued physical rollout of infrastructure suggests that this has been replaced by South-South FDI flows, domestic financing, reinvested profits, and other sources.

Competitive, well regulated private investment remains the key to meeting the growing demand for ICI. There is plentiful evidence that countries that have introduced private competition under capable regulators have seen faster rollout of services and lower costs. Independent regulation and competition together raise private investment by 50 percent. In turn, private investment is related to higher teledensities and greater efficiency in the sector. Competition can also reduce prices by as much as 20 percent. Regarding the Internet and e-commerce, cross-country studies suggest that rollout of affordable infrastructure is the most important factor, after income per capita, in explaining takeup. In developing countries with private, competitive provision of services, enterprises rarely see poor telecommunications as a constraint to doing business—the picture is significantly different in countries that have yet to complete their reform agenda.

Going forward, there are considerable investment needs for ICI in developing countries. In the developing world as a whole, one recent estimate suggests that 2005 to 2010 investment requirements for new capacity will exceed US$100 billion. Sub-Saharan Africa alone may spend over US$5 billion to cover new investment and maintenance of existing telecommunications stock.

The first question is, how to attract the private financing to meet those needs. Completing the basic reform agenda is a priority, considering that nearly half of the world's governments still maintain a monopoly in the international segment. Reform covering FDI (where many countries limit foreign participation in ICI to less than 50 percent), WTO telecommunications commitments, regulatory stability, and capacity building will help attract and retain financing. Also, a regulatory environment that allows rural operators to cover higher costs of service provision through interconnection payments from urban operators may encourage investment in more sparsely populated areas. Broader issues include the costs of doing business due to weak financial markets, complex approval processes, outdated corporate laws, punitive taxation rates, and corruption.

But even with greater private involvement, gaps will remain. It is unlikely that the private sector alone will deliver advanced services to sparsely populated areas where the economics of networks make service costly to roll out. Backbone facilities—especially those that cross borders—have long payback periods and heavy transactions costs. And broadband, a new, relatively untested technology where investment risk and return profiles are little understood in developing countries, may see slow rollout. In these cases, as well as in emergency situations and post-conflict environments, there may be a role for innovative public financing mechanisms to catalyze, or in extreme cases substitute for, private investment flows.

Some investment gaps can be filled with pro-investment policy and regulation. These interventions go beyond ensuring a competitive market to leverage natural scarcities and asset sales to promote access goals instead of transfers to the Treasury through large payments. License sales and privatization transactions can be designed with investment and rollout criteria (as opposed to payments to the Treasury) as elements of the bid evaluation process to speed ICI development.

Some gaps can be filled by leveraging the government's role as consumer and infrastructure owner. The government has considerable leverage in the sector purely as a major consumer of ICI services. By offering to pay for services to be rolled out to public sector operations in rural areas such as schools, hospitals, and customs posts, governments can provide an incentive to private operators to serve local communities. Governments also own a considerable number of rights of way, such as roads and railway networks. Providing ducting for cable along these routes on a non-discriminatory basis will, for example, foster the development of competitive backbone provision. Some government-owned infrastructure services may already have their own private telecommunications networks with spare capacity that can also be made available.

Some gaps may require government-supported access initiatives. Government-supported output-based mechanisms which have been used to subsidize the lowest competitive bidder to provide telecommunications in previously unserved areas might also be applied to deployment of broadband and national and international backbone. Low interest operator loans and microcredit to telecenter owners are other methods that have been used to roll out access, and there may be a role in some cases (particularly for broadband) for direct government investment, perhaps at the sub-sovereign level. Universal access funds are one way to finance such mechanisms. Universal access to basic information and communications infrastructure might be achievable worldwide based on national universal access funds which use a levy on operators as a first source of income, with additional funds from government and donors if required. A very approximate estimate suggests that the additional funds required above a 2 percent levy would equal less than US$2 billion globally, if all countries had completed the basic reform agenda prior to launching access initiatives.

The donor community plays a relatively small role in overall financing. Investment support for publicly-owned operators declined significantly over the course of the 1990s as the private sector took the lead role. Even while support for private operators from international financial institutions (IFIs) significantly ramped up, they were involved in only sixteen percent of major private participation in infrastructure (PPI) telecommunications investments in the 1990s.

But the role for donors and the WBG can be significant. IFIs have played an important counter-cyclical role in supporting private investment since 2000. IFI support for private investments will continue to have a major catalytic role, as will investment guarantee agencies such as MIGA. Donors, and specifically the World Bank Group, will continue to provide technical assistance and investment in the sector. Regarding investment to catalyze rollout of access and backbone initiatives, especially at the international level, it is expected that this role will grow. There may also be a place for a new or expanded facility to provide technical assistance on a grant basis to countries undergoing reform or piloting innovative approaches to sector and regulatory policy.

Financing Information and Communication Infrastructure Needs in the Developing World

1. There has been a massive rollout of ICI in the 1990s

In the past it has been said that "Manhattan has more telephones than Africa."[1] Happily, this is a statistic that has been overtaken by events. There were 22 million fixed and 37 million mobile lines in Africa in 2002, according to the International Telecommunications Union (ITU). The population of Manhattan is about 1.5 million. During the day, perhaps it reaches five million. Unless New Yorkers and their commuter friends have 12 phones each, Africa now has many more telephones than Manhattan. That's because telephones have been spreading across Africa at an incredible, historically unprecedented rate over the past ten years.[2]

In this, Africa is part of a worldwide trend of rapid rollout. Globally, there have been huge improvements in access to telecommunications (see Table One). This applies to countries rich and poor, reformed or not, African, Asian, European, and Latin American. Furthermore, developing countries are catching up with the rich world in terms of access, with far higher growth rates in the developing world than in OECD countries. For example, according to ITU (2004) data, China has more telephones than any other country in the world, and China, India, and Brazil lead the world in the number of public pay phones.

Table One: Teledensity (fixed+mobile) per region

	1990	1996	2002
SSA	1	1.4	5.3
EAP	5.5	11.6	38.1
ECA	12.8	17.3	38.9
LAC	6.4	11.5	36.7
MENA	4.7	8.3	22.4
SAR	0.6	1.5	4.5
Developed Countries	46.5	64.1	120.1

Within developing countries, rural areas are catching up with urban areas (although gaps remain considerable). In Burkina Faso, there were fewer than 7,000 telephones outside the capital city in 1990, serving a population of 8.3 million people spread across an area of over 100,000 square miles. Today, the mobile footprint covers 5.4 million people outside of the capital—more than 50 percent of the population living outside of Ouagadougou (Keremane and Kenny, 2005).

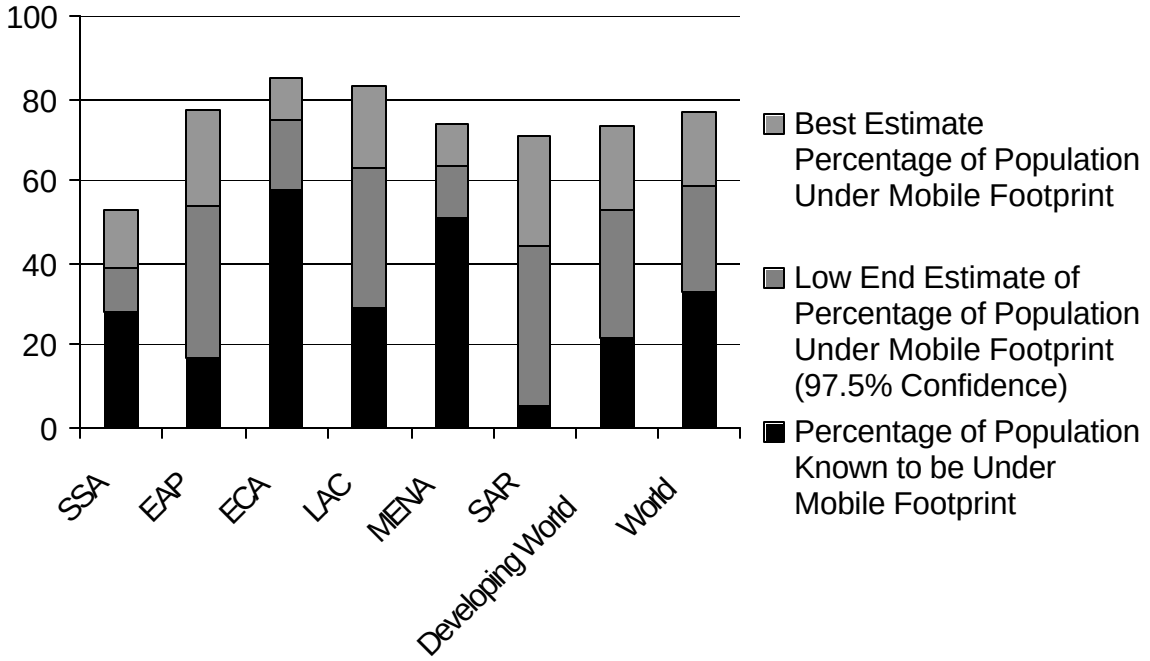
[1] A Google search for "Manhattan more telephones Africa" gets over 70,000 hits.

[2] Looking at just Sub-Saharan Africa, there are 10 million fixed and 26 million mobile telephones, suggesting 7 telephones for each Manhattanite and commuter.

This rapid growth in access has been driven by mobile telephony. Fixed telephony was in existence for 113 years before fixed teledensity reached one in ten of the global population. Mobile achieved the same penetration level in just 15 years (Kenny et. al. 2003). The mobile revolution has increased the number of mobile subscribers worldwide from 11.2 million in 1990 to 1.16 billion in 2002. In that year, the ITU reported on the percentage of the population under the mobile footprint in 112 countries, finding that those populations (which exclude China and India), total 2 billion people. Using the available numbers to estimate the footprint coverage in countries that did not report coverage data, 4.7 billion may already be under the mobile footprint—77 percent of the world's population (see Figure 1).[3]

The WSIS plan of action called for more than one half of the world's population to have access to information and communication technologies (ICTs) by 2015. If that is defined as access to mobile services, that goal has already been surpassed in every developing region. If the 30 remaining countries covered by ITU data that have not introduced competition in the mobile segment were to introduce competition, an additional 50 million people would come under the mobile footprint.[4] It should be noted that we have already certainly surpassed 50 percent of the world's households having a telephone as well—with the figure in 2002 standing at 49.8 percent, according to the ITU.

Figure 1: Estimated Global Mobile Footprint Coverage



[3] While the extension of the mobile footprint into rural areas greatly increases the chance that any individual rural person will be able to access a telephone at some point, it remains the case that the level and quality of that access will be far lower than if they were to have their own subscription or line or access to a public telephone.

[4] See Keremane and Kenny, 2005, for regression analysis.

Note: estimate derived by regressing footprint percent coverage on GDP/capita and GDP/area, and using coefficients derived to calculate coverage in non-reporting countries. See Keremane and Kenny, 2005. The 97.5 percent confidence column presents the level of rollout that we can be 97.5 percent sure has been reached.

All of this evidence suggests that, at least in terms of access to basic infrastructure, the digital divide is rapidly closing. Many fewer people around the world have no access at all to ICTs, and people in the developing world are getting more access at an incredible rate—far faster than they got access to new technologies in the past, and far faster than developing countries are adding telephone lines today. However large the 'supply constraint' on ICTs remains—and there is evidence that in many developing countries it does remain large—supply constraint has shrunk considerably over the last ten years.

2. The picture is more mixed for advanced ICI

Regarding access to more advanced ICTs, the picture remains one of considerable growth, but also significant gaps. The growth of Internet users in the developing world has been faster than growth rates in rich countries since the mid 1990s, and compared to what might be expected given the size of their economies, the developing world is doing very well in terms of usage. Nonetheless, only about one in 100 sub-Saharan Africans, use the Internet. And South Asia, the Middle East, and Africa are far behind in terms of hosting web sites (see Table Two). The picture with computers in education is similarly mixed.[5]

Table Two: ICT Applications Worldwide

	Internet Users		Internet Hosts		PCs	
	per 1,000 inhabitants	per US$ m of GDP	per 1,000 inhabitants	per US$ m of GDP	per 1,000 inhabitants	per US$ m of GDP
SSA	9.3	19.9	0.4	0.8	12.0	23.2
EAP	54.6	42.5	1.9	1.5	34.3	26.7
ECA	72.2	29.9	4.5	1.9	74.9	27.9
LAC	82.5	25.5	8.4	2.6	68.2	20.7
MENA	45.1	16	0.8	0.3	47.9	17.0
SAR	13.4	28.1	0.1	0.1	6.8	14.3
Developing World	41.5	30.8	2.0	1.5	32.3	23.0
World	103	19.4	26.2	4.9	102.4	18.4

Across the world, there have been dramatic increases in international Internet bandwidth. In Africa, bandwidth tripled in 2000, while world bandwidth increased over 400 percent.[6]

[5] Computers in schools per 1,000 inhabitants equal just 0.3 in South Asia and are between two and four in East Asia, ECA, and Latin America (based on data for fifty countries).

[6] The 30 Gbps capacity SAT-3 cable off the coast of West Africa accounts for a significant share of recent increases for the sub-Saharan region.

Still, in more recent years, growth has slowed—growth rates dropped to about 80 percent globally in 2003, and perhaps 70 percent in Africa (Primetrica, 2003).

Furthermore, there are only six Internet exchanges in the sub-Saharan region, and interregional Internet bandwidth between Africa and the US is less than one three hundredth of the capacity between the US and Europe. When compared to *trade* between sub-Saharan Africa and the US, which is more than *ten percent* of European-US trade, this bandwidth seems low.[7] Globally, the number of broadband subscribers and international bandwidth in the developing world is far lower than its share of the world economy would suggest. Sub-Saharan Africa has less than one thirtieth of the broadband subscribers and less than one eighth of the international bandwidth than would be suggested by its share of world GDP (see Table Three).

Table Three: Broadband and Backbone

	Broadband subscribers - 2003		**International Bandwidth(Gbps) - 2003**			
	per 1,000 inhabitants	per US$ mil of GDP	per 1,000 inhabitants	per US$ mil of GDP	per Internet User	per Broadband subscriber
SSA	0.1	0.1	3.8	8	0.4	126
EAP	8.6	6.7	47	36.6	0.9	5.5
ECA	3.5	1.2	141	58.1	2	82.2
LAC	3.6	1	62.5	19	0.8	19
MENA	3.7	1.1	24.5	8.7	0.5	9.1
SAR	0.1	0.3	2.7	5.7	0.2	26.5
Developing World	4.7	3.1	38.4	28.4	0.9	10.5
World	20.2	3.2	363.6	68.4	3.5	22.2

3. Advance to date has been due to new technologies, declining costs, and considerable investment

Driving the worldwide trend towards infrastructure rollout is the availability of new technology and falling prices, combined with considerable investment spent with greater efficiency. As but one of numerous examples of falling costs, fixed line switching costs have dropped over 50 percent in the last decade, and may fall a further 75 percent in the next few years (Ure 2004).

At the same time, over the last ten years, annual telecommunications investment in the developing world has doubled. Although investment has declined from its peak in 2000, the decline has been less dramatic in the developing than the rich world. Telecommunication investments in the developing world were 21 percent of the world

[7] Trade data from USITC, bandwidth data from Primetrica (2003).

total in 1992, rising to 46 percent by 2002 as developing country investments rose while wealthy country investment ratios stagnated (see Figure Two).

Figure Two: Telecommunications Investment in the Developing and Developed World

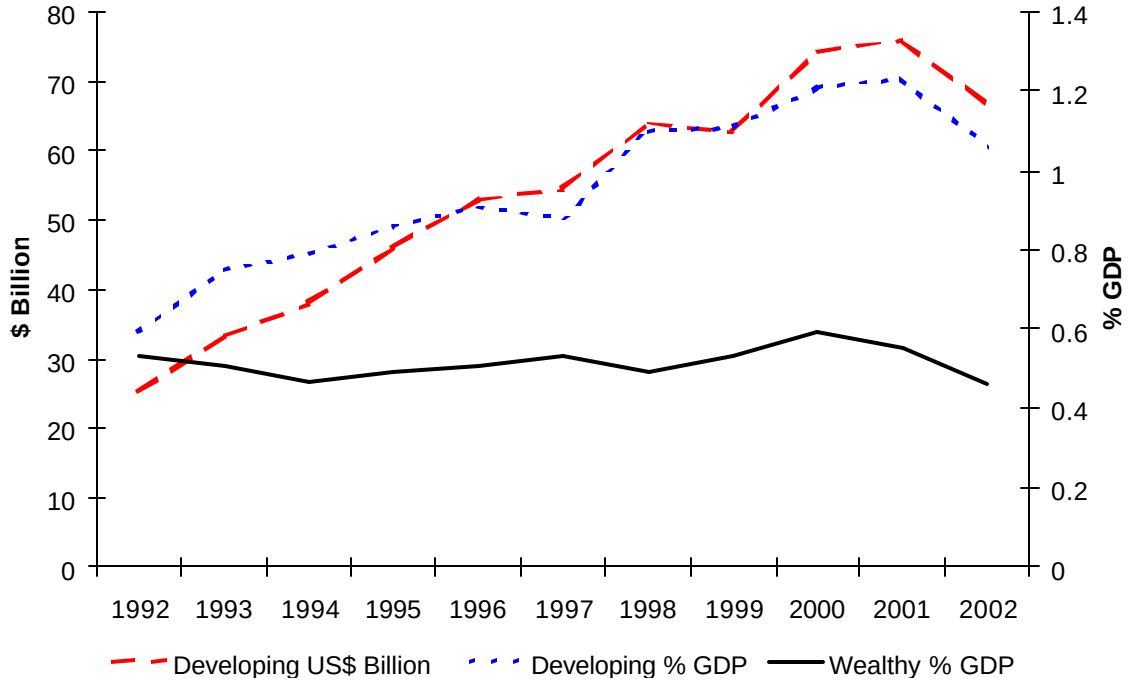


Table Four reports on telecommunications investment per capita, as (a) a percentage of GDP; (b) an absolute number for the regions of the world; and (c) a global total for the period 1995-2002. This suggests that the developing world has seen telecommunications investments of around US$500 billion since 1995. As a percentage of GDP by region, East Asia, Latin America, and sub-Saharan Africa are considerably ahead of the world average.

It should be noted, however, that the greater gaps in advanced ICT access are reflected in broader measures of ICT investment. While total ICT expenditure as a percentage of GDP has been growing dramatically in developing countries, the numbers are lower than the same figures in wealthy countries. Sub-Saharan Africa spends 6.3 percent of GDP on ICTs compared to 8.2 percent in the developed world, for example.

Table Four: Investment and Expenditure in Telecommunications and ICT

Region	Investment in Telecommunications			Average ICT expenditure as % of GDP[8]
	Investment per Capita (average 1995-2002)	Investment % GDP (average 1995-2002)	Investment US$m (additive total 1995-2002)	
SSA	6.1	1	22,600	6.3
EAP	17.3	1.4	231,800	6.1
ECA	14.7	0.7	55,000	5.8
LAC	35.9	0.9	131,600	5.6
MENA	19.6	0.6	29,500	5.2
SAR	2.6	0.6	27,000	5.2
Developing World	13.7	1	497,400	5.7
Developed World	138.5	0.5	985,500	8.2
World	34.2	0.6	1,482,900	6.5

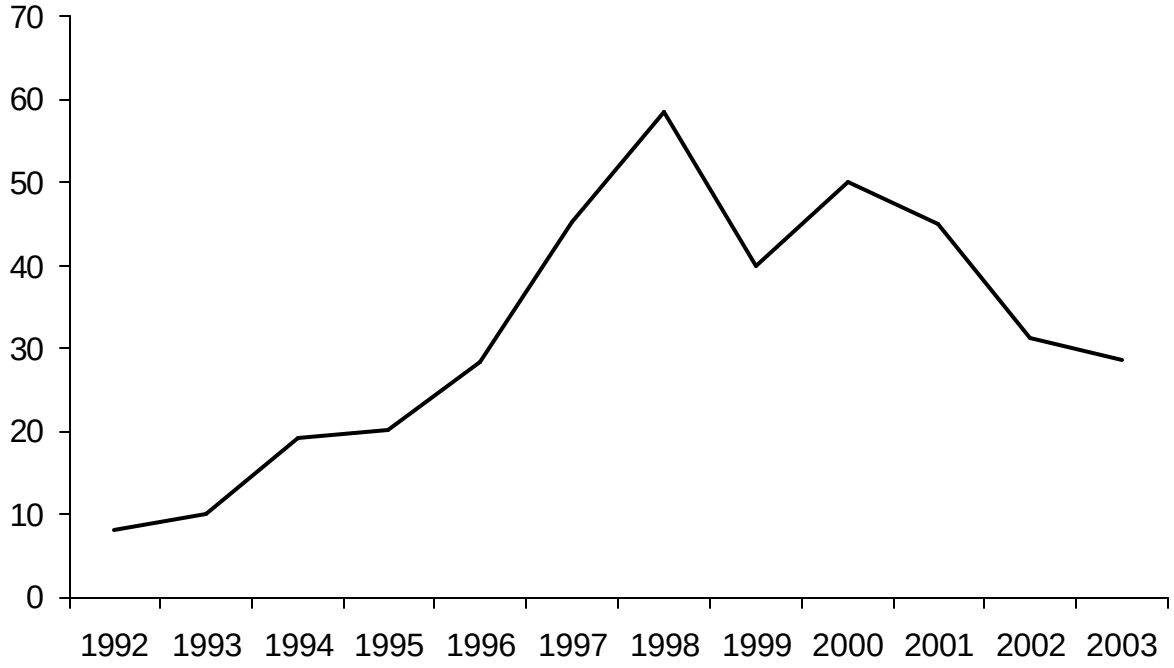
4. A growing share of ICI investment is private

In addition to investment shifting towards new technologies, the source of that investment has also changed markedly over the past ten years—with an increasing percentage coming from private operators. The private participation in infrastructure database that captures outside private investments in telecommunications projects in developing countries suggests that investments in infrastructure projects with private participation totaled US$210 billion 1992-2002 (see Figure Three).[9]

[8] ICT expenditures include external spending on information technology (tangible spending on information technology products purchased by businesses, households, governments, and education institutions from vendors or organizations outside the purchasing entity), internal spending on information technology (intangible spending on internally customized software, capital depreciation, and the like), and spending on telecommunications services and other office equipment.

[9] The PPI Database records all infrastructure projects with private participation that directly or indirectly serve the public (captive facilities – such as private telecommunications, are excluded). Projects are considered to have private participation if a private company or investor bears a share of the project's operating risk. A foreign state-owned enterprise is considered a private entity. The investment figures include investments in expanding and modernizing facilities, as well as expenditures on acquiring government assets such as state-owned enterprises or rights to use radio spectrum. The projects have generally been recorded on a commitment basis in the year of financial closure, but actual disbursements are not tracked. Our figures include only private contributions. The four types of projects included in the PPI Database are the following: *Management and Lease Contracts:* A private entity takes over the management of a state-owned enterprise for a given period. The facility is owned by the public sector, and investment decisions and financial responsibilities also remain with that sector. *Concessions:* A private entity takes over the management of a state-owned enterprise for a given period during which it also assumes significant investment risk. *Greenfield Projects:* A private entity or a public-private joint venture builds and operates a new facility for the period specified in the project contract. *Divestitures:* A private

Figure Three: Private Participation in Infrastructure (PPI) in Telecommunications in Developing Countries (US$ Bn)



This is equal to 60 percent of the ITU's estimate of total investment in telecommunications in developing countries over that period, although the two numbers are not exactly comparable.[10] One-hundred-eleven countries have attracted private participation in telecommunications infrastructure worth more than 1 percent of their GDP in aggregate over the period spanning 1990 to 2002, including 34 countries in Africa (see Table Five). Sixty-six developing countries have attracted private participation in telecommunications infrastructure worth in aggregate more than 5 percent of their GDP over 1990-2002, including 14 in the sub-Saharan region.

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entity buys an equity stake in a state-owned enterprise through an asset sale, public offering, or mass privatization program.

[10] The Telecom Investment variable refers to the expenditure associated with acquiring the ownership of telecommunication *equipment* infrastructure (including supporting land and buildings and non-tangible property such as computer software). These include expenditure on initial installations and on additions to existing installations, by both public and private actors (governments, public operators, privatized incumbents and competitive carriers as well.)

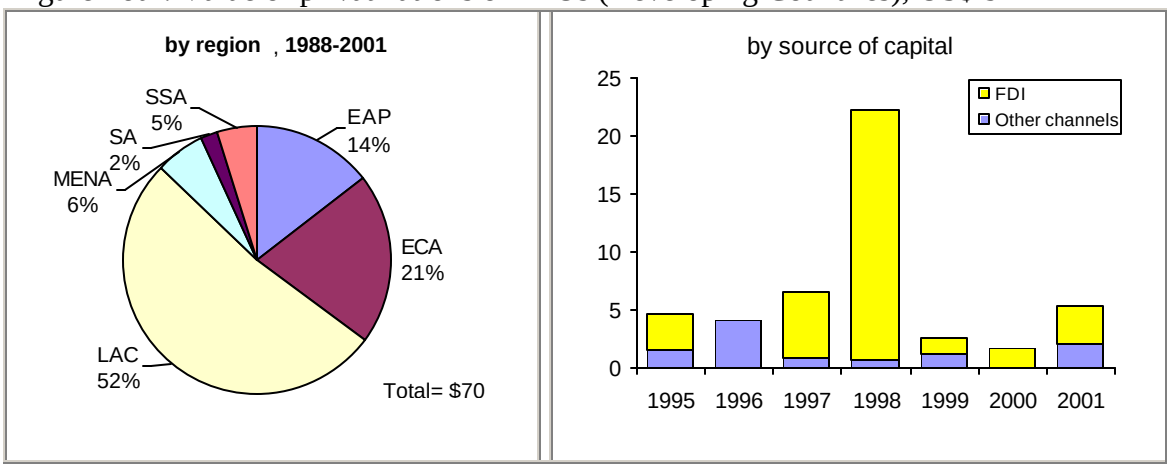
Table Five: Total (1990-2002) Telecommunications PPI per Region

Region	PPI (US$ million)	PPI as % of Region GDP	% Countries that Attracted > 1% GDP in PPI	% Countries that Attracted > 5% GDP in PPI
SSA	21,749	6.9	74	30
EAP	54,885	2.4	43	29
ECA	78,900	6.8	86	64
LAC	179,512	10.8	56	44
MENA	15,500	1.8	43	14
SAR	21,527	3.4	75	38

Between 1990 and 2000, over 350 private operators began providing mobile services in more than 100 developing countries. By 2003, among all 164 countries with available data, 130 had three or more competing digital mobile operators (Guislain and Qiang, 2004). In Africa, the top six (private) strategic investors in mobile had total revenues in 2003 estimated at US$7 billion, with profits of US$800 million.[11]

Moreover, since 1988, 76 developing countries have privatized their public telecommunication operators, raising over US$70 billion (see Figure Four).[12] About two-thirds of this investment has come from outside the home country of the privatized operator and, in most cases, through the sale of a minority share of a PTO to a foreign strategic partner (Guislain and Qiang, 2004).

Figure Four: Value of privatizations of PTOs (Developing Countries), US$ bn



Source: Qiang and Guislain, 2004.

[11] The companies are Vodacom, MTN, Orange, Orascom, Celtel and Milicom. The data relates to the continent of Africa, and revenues and profits for Orange were estimated from its share in Africa's subscriber base. Data from ITU News No5 June, 2004.

[12] The first recorded PTO privatization in developing countries was Chile in 1988, according to the ITU database. Privatization may include FDI, public offerings (initial, domestic, international), as well as sale to employees and sale to local investors.

There has been a recent downturn in private participation in infrastructure (PPI) in telecommunications in part related to the collapse of the telecom bubble in the West, but it is worth noting that levels of PPI are still above the 1996 level, and that the recent decline in PPI is far less dramatic than has been seen in the energy, transport, and water and sewage sectors—suggesting that the reasons for the decline are connected with general macroeconomic factors at least as much as sector-specific issues.

Furthermore, the decline in investments captured by the PPI database does not necessarily reflect a decline in total private investment in developing country telecommunications networks, merely a change in the nature of the investment occurring. FDI accounted for approximately 83 percent of all private investment in LDC telecommunications companies over the period from 1990 to 2002 (Ure, 2004). FDI flows *have* fallen considerably, especially from the North.[13] This is in large part because the end of major privatizations and spectrum license awards reduced the scope for further significant FDI flows (Guislain and Qiang, 2004). But it should be noted that neither these license payments nor the purchase of existing infrastructure in themselves financed infrastructure *rollout*, which is where the bulk of telecommunications investment will be directed in the future.

At this point, it is not surprising that internal sources of financing would become more important, as well as funding from local markets which does not show up as FDI and is not captured well in the PPI database.[14] Across all sectors, evidence from a sample of emerging economies in the mid-1990s suggests that net private capital flows (which include FDI flows as well as loans and portfolio investment) account for perhaps one quarter of total private investment. Domestic capital market issuance activity (some of which will be to foreign investors) accounted for approximately one half of private investment, suggesting somewhere between one quarter and one half of private investment in the sample countries was accounted for by retained earnings.[15] Telecommunications companies in developing countries will be moving towards these norms, and this is reflected in two recent IFC telecommunications projects that involved domestic capital market support (see Box One).

[13] Of IFC-supported telecommunications investments in 2004, all but one involved South-South financing.

[14] Having said that, a sharp drop-off in new deals, reflected in new privates sector commitments of just USD 2.8bn recorded in the PPI database in 2002, does suggest that absent a rapid turn-around in commitments, investment flows will continue to decline over the next few years.

[15] Results calculated from data on domestic capital market issuance activity and private investment figures 1991-1995 from Glen and Sumlinski (1997) and net private capital flows for 1994 from World Bank (1996) for a sample of countries including Argentina, Brazil, Chile, China, Colombia, Hungary, India, Indonesia, Jordan, Malaysia, Mexico, Pakistan, Peru, Philippines, Portugal, Thailand, Tunisia, Turkey, and Venezuela.

Box One: IFC Activities in Support of Local Financing for Private Telecommunications

Bharti Mobile Limited (BML) is a cellular telephone operating company in Karnataka and Andhra Pradesh. The company desired local currency funds to support investment in network expansion while minimizing foreign exchange risk. The IFC provided a US$50 million partial guarantee of the local currency debenture issued by BML, which enabled the mobilization of a significant amo unt of funds, encouraged investments from non-banking institutional investors who would have been unlikely to lend to an infrastructure development project without IFC's guarantee, and increased the breadth of the securities market in India.

In Thailand, TelecomAsia wanted to convert most of its US$500 million foreign debt into baht to minimize foreign exchange risk and strengthen the firm's financial position. An IFC structured partial credit guarantee on US$77million of a local bond issue by TelecomAsia supported the company in issuing 11.7 billion baht (US$270 million) of six-year bonds, and 6.75 billion baht (US$155 million) of eight-year bonds. The new IFC-backed bonds have maturities of eight years, compared with the previous five-year standard. The completion of the transaction provided access to previously unavailable long-term, local-currency financing for TelecomAsia.

Publicly listed telecommunications companies in particular have raised significant funds through the local stock market. There are 30 publicly listed telecommunications companies in the East Asia region alone (compared to four in 1990), with a total market capitalization of US$465 billion (Ure, 2004).[16] In Africa, one operator active in 13 countries on the continent raised a US$190 million loan at the end of 2004 to help fund expansion, and is planning an IPO in 2005.[17] Furthermore, as operators mature, retained earnings provide a growing source of financing. One operator active in the Africa region, for example, had headline earnings equal to 87 percent of capital expenditure in 2004. As it paid no dividends and had little debt principal to pay down, it used the these resources to invest in expansion.[18]

Overall, while North-South FDI may have declined, continuing rapid rollout and the far less significant drop in total telecommunications investment as measured by the ITU (where 2002 investment remained higher than 1999 levels) suggests that South-South and domestic financing, combined with retained earnings, have grown sharply enough to stave off any collapse in sector growth.

5. Competitive, well regulated private investment remains the key to meeting the growing demand for ICI

The evidence is overwhelming that countries which have introduced the private, competitive provision of telecommunications services under a strong regulatory framework have seen far more rapid rollout of information and communication infrastructure. One recent study suggested that low income countries which had seen

[16] An additional benefit of listing is growing the stock market –accounts for 25 percent of market cap. In Philippines

[17] WMRC Perspective January 6th: Celtel Raises US$190 million Loan for Expansion.

[18] Source: MTN Annual Report, 2004.

considerable reform towards competition saw a growth of 1,075 percent in Internet users over the 1998 to 2000 period, compared to 405 percent growth in countries that were lagging on the basic reform agenda. The same study suggested that fixed and mobile teledensity was approximately 80 percent higher in reformed low income countries than in non-reformed countries (Kenny et. al., 2003).[19]

It is also clear from numerous studies that competitive provision reduces costs. Rossotto et. al. (2004) find that fully competitive international markets see international call costs 66 percent lower than those countries with partial competition. Prices for a basket of fixed telecommunications services are 20 percent lower in countries with competition than countries where there is a monopoly in provision (see Table Six—the limited apparent impact of competition on mobile prices is based on a very small number of atypical countries in the sample with a mobile monopoly).

Table Six: Prices and Competition

(Averages 2000-2002)	**No Competition in relevant sector segment (mobile for mobile prices, fixed for fixed prices)**	**Competition in relevant sector segment (mobile for mobile prices, fixed for fixed prices)**
Mobile price basket	33.3	32.7
Fixed price basket	48.8	38.8

Note: Sample of 45 Countries

Looking at private participation, countries with greater private involvement in the incumbent also see higher rollout of services, more efficiency, and higher investment flows (see Tables Seven and Eight).[20]

Table Seven: Impact of Private Investment on Rollout

(Averages 2000-2002)	**Countries with PPI Commitments> 1 % of 2002 GDP**	**Countries without PPI Commitments< 1 % of 2002 GDP**
Telephone Subscribers/capita	34.75	31.77
Lines/Employee	121	115
Waiting List % Mainlines	11.6	12.3

Note: Sample of 45 Countries

[19] One global study based on experience of 86 countries from 1985 to 1999 found that sector reform was associated with an 8 percent higher level of mainline provision and a 21 percent higher level of labor productivity compared with nonreformed countries (Fink et. al., 200x). Another recent review found that the average annual growth rate of fixed line rollout was 50 percent higher in liberalized telecom markets with a separate regulator than in countries with a state monopoly and no separate regulator. "Not liberalized" is defined as having monopoly or duopoly operator for basic line services; "liberalized" markets have three or more operators. (Qiang and Pitt 2003)

[20] Privatization increases the number of phones per 100 by 1.2. Privatization also increases the amount of FDI by 0.52 cents per dollar of GDP (Reynolds et. al. 2004).

Table Eight: Impact of Private Involvement on Rollout, Efficiency and Investment

	% Private involvement in incumbent		
	0	**0<%<51**	**51% and more**
Total telephone Users (as % of pop) - 2002	19	36.3	40
Internet Users (as % of pop) -2002	3.4	9.1	10
Main Lines per employee -2002	81	97	159
Average cumulative ITU Investment as a % of GDP (1998-2002)	2	2.5	3.6
Average Cumulative PPI Investment Commitments as % of GDP (1998-2002)	0.6	0.6	1.2

Sample of 120 developing countries

Absent a strong independent regulator, the effects of competition are muted and the impact of privatization can be dissipated.[21] At the same time, it is important to note the risk of regulatory failure—excessive, poorly designed, or poorly implemented regulation. Regulatory institutions in developing countries are likely to have comparatively limited capacities, and so it is important to ensure that regulatory structures are designed to minimize the burden of regulation.[22] Sectors should be made to operate efficiently through the mechanism of competition, with regulatory intervention only used where competitive forces do not or cannot operate effectively. Indeed, the story of Somalia, where private competition has flourished in the absence of a telecommunications policy or sector regulator suggests that concern over the capacity of the regulator is no reason to delay competitive introduction of services (see Box Two).

[21] See Wallsten, 1999. The impact of improved regulation is clear from the countries of the Organization of Eastern Caribbean States (OECS), for example. Five member countries of the OECS set up the world's first regional telecommunications regulator with the help of the World Bank. Even before the regulator began introducing competition to the private monopoly telecommunications provider in the five island states, its mere presence had helped reduce the cost of international telecommunications in the region by as much as 50 percent.

[22] This suggests, for example, limiting specific licensing to cases where there is a natural limit to entry (such as with spectrum use), and using class licenses or a free entry regime where possible. If technological change leads to spectrum no longer being a scarce resource, this will be one less role for policy makers and regulators to play. It might soon be possible to move to a system completely based on class licenses.

Box Two: Somalia's Telecommunications Sector

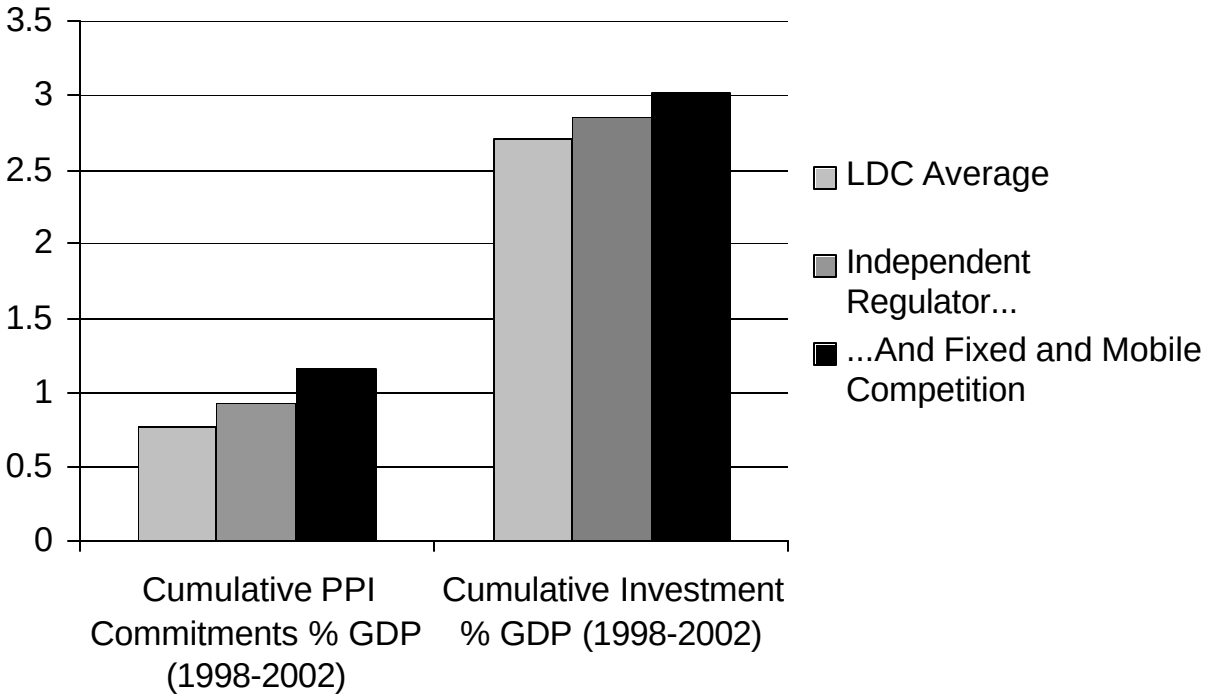
There is no central government in Somalia. There is little foreign investment, and no investment promotion. Corporate law, it would be fair to say, is far from transparent. There is no telecommunications policy, and no regulator. The (17,000 line, two city) government network that existed in the late 1980s was comprehensively destroyed in the fighting that broke out in 1991, reducing teledensity to zero.

Since then, nine private operators have set up shop in various parts of the country, providing telecommunications service to every province, city, and major town. There are over 160,000 fixed and mobile subscribers. Fixed teledensity is higher than many of the country's neighbors (almost three times Ethiopia's) and prices are some of the lowest on the continent. International calls cost only 60 cents per minute, for example.

Somalia's model is by no means 'best practice': undoubtedly more progress would have been made had there been a competent regulator implementing pro-competitive policies (to say nothing of a more stable investment climate). There are important issues to be resolved—interconnection agreements took some time to put in place and are not yet fully operational, and spectrum interference is becoming a larger problem for example. Nonetheless, progress has been considerable, and with the assistance of the ITU, operators have begun to come together to tackle sector issues under the umbrella of the Somali Telecommunications Association.

Countries which complete the basic reform agenda also attract both more total investment and a greater percentage of private participation in investment, as can be seen from Figure Five.

Figure Five: Attracting Investment and PPI (cumulative average 1998-2002)



Note: Sample of 45 Countries

Regarding access to the Internet, in a recent paper based on cross-country analysis (Chinn and Farlie, 2004) the authors conclude that "the global digital divide is mainly—but by no means entirely—accounted for by income differentials." For Internet usage, the two next most important factors were regulatory quality and telephone density—again suggesting the importance of the core telecommunications reform agenda. Other factors that had some impact on Internet use were schooling and illiteracy, youth and aged dependency ratios, urbanization, and electricity consumption.[23] Regarding the extent of e-commerce, cross-country studies again suggest the criticality of the underlying infrastructure but also strong institutional structures in the shape of the "rule of law" and the availability of credible payment channels such as credit cards (Oxley and Yeung, 2001).

The ITU (2003a, b) reports that the number of broadband subscribers per capita is (again) largely a function of income differences (which alone account for 70 percent of the difference in the cross-country subscriber rates) and urbanization. However, policies and prices can play a role—and prices for broadband vary considerably across developing countries. People in Thailand paid US$68.26 per month for 100 kbits/second capacity compared to US$2.75 in Jordan, for example. One reason for the variation in prices and access is competition, as is clear from Table Nine.[24] However, lack of access to international cable capacity clearly also plays a role. Broadband prices per month for 100 kbits/second in Tonga, for example, reach US$437.

Table Nine: Data Competition, Prices and Usage

Impact of data competition in 2002	Average in countries with Data Monopoly	Average in countries with Data Competition
Internet Users / 1000 inhab	75	145
PCs / 1000 inhab	66	151
PCs in education / 1000 inhab	4	22
Broadband subscribers / 1000 inhab *	10	29
International Bandwidth / 1000 inhab (Gpbs) *	120	854
Internet prices (US$ per 20h of use) *	35	32

* 2003 Data

Overall then, there is strong evidence that if the basic reform agenda is completed across the developing world, gaps between supply and demand for ICT services would further shrink. This is also clear from survey results in the developing world. Looking at business requirements for telecommunications, we have evidence from surveys that ask entrepreneurs in the developing world about the constraints to the growth of their businesses, including a question regarding the seriousness of constraints created by

[23] Dasgupta, Lall and Wheeler (2001) come to a very similar conclusion.

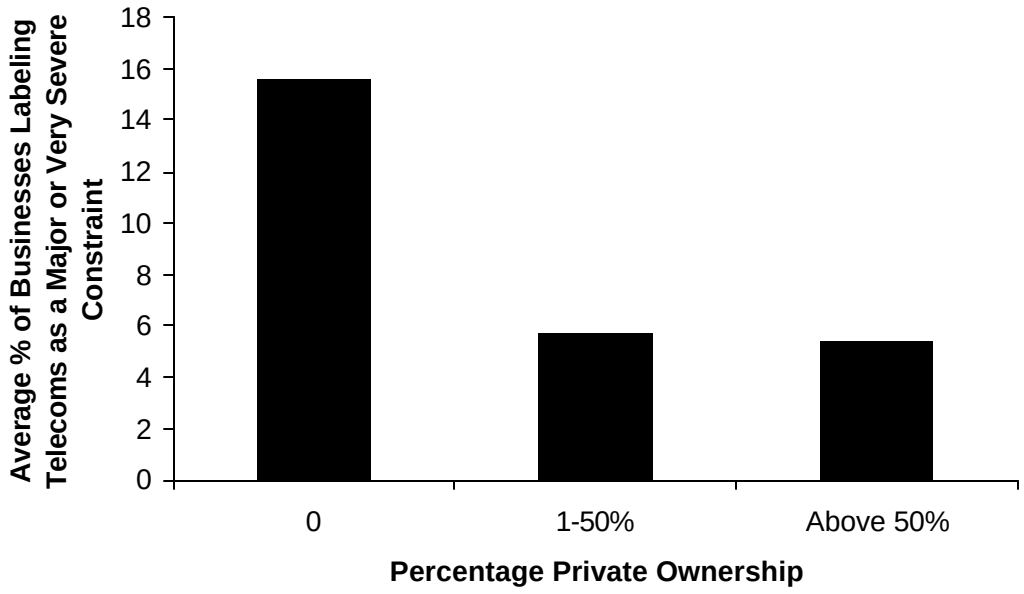
[24] See also ITU, 2003a, which also notes that cross-ownership of cable by the incumbent telecommunications operators can considerably slow growth.

inadequate telecommunications services. Some good news is that, no doubt as a result of significant worldwide improvements in access and quality of telecommunications, telecommunications limitations rank far down in the concerns of most businesses worldwide—last out of a list of 14 constraints including factors such as policy uncertainty, corruption, electricity, transportation, and access to land. The average worldwide for the 45 countries for which data exists is that only 9.8 percent of companies rate telecommunications as a major or very severe constraint to doing business (compare to around 40 percent for the top-ranked concerns of policy uncertainty, macro instability, the tax rate, and corruption, and above 20 percent for electricity).

At the same time, in some countries, telecommunications *is* seen as a major constraint—29 percent of firms in Ethiopia rank telecommunications as a major or severe constraint, along with 25 percent in Bangladesh, 44 percent in Kenya, 59 percent in Nigeria, and 33 percent in Zambia.

Further good news, however, is that policy change can have a dramatic impact on the telecommunications constraints to business development. In countries where more than 50 percent of the incumbent telecommunications operator was in private hands, only an average of 5.4 percent of firms saw telecommunications as a major or severe constraint—as compared to nearly 16 percent in countries where the incumbent was fully state-owned. In other words, policy reform can significantly reduce remaining supply constraints on telecommunications services (see Figure Six).

Figure Six: Private Participation and Business Satisfaction[25]



[25] As measured by private ownership of incumbent.

6. Going forward, there are considerable investment needs for ICI in developing countries

While much progress has been made in closing telecommunications supply gaps in developing countries, there is still a long way to go, both to fill existing supply gaps and also to meet growing global demand for telecommunications services. In order to continue recent rates of progress and reach a fixed and mobile teledensity of 11.4 percent in low income countries, and 91.2 percent in middle income countries by 2010, Fay and Yepes (2003) estimate that the developing world will need to invest approximately 1.2 percent of its GDP per year, or over US$100 billion, in new capacity. Sub-Saharan Africa alone will have to invest US$3.8 billion each year in new capacity. And these figures do not account for growing requirements to fund broadband, for example (see Table Ten).

Table Ten: Telecommunications Investment Requirements

Annual Requirements for Developing World Telecommunications Investment, 2005-2010

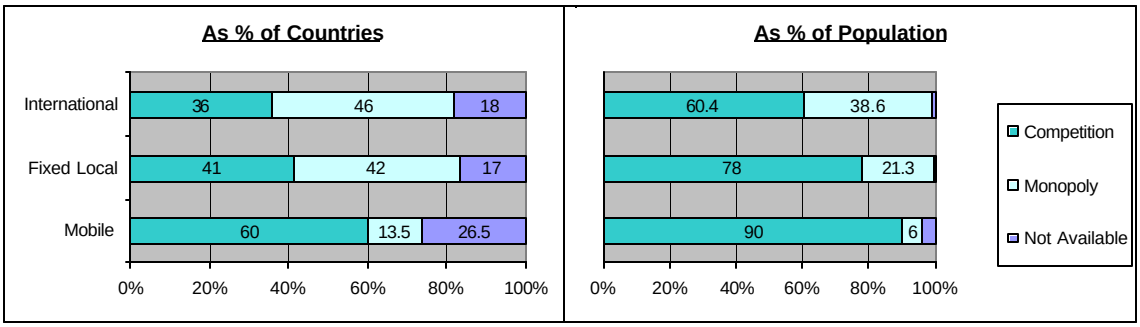
	New Capacity	Maintenance
Developing World, US$m	104,986	82,040
Developing World % GDP	1.24	0.96
Sub-Saharan Africa, US$m	3,814	2,834
Sub-Saharan Africa, % GDP	0.82	0.61

Source: Fay and Yepes: 2003

7. The first question is, how to attract the private financing to meet those needs efficiently

The first step for many countries to attract greater private competitive financing is to complete the basic reform agenda of opening up to private competitive operators. ITU data suggests that at least 46 percent of countries retain international monopolies, 42 percent have fixed local monopolies and 14 percent have mobile service monopolies, suggesting a considerable unfinished agenda (see Figure Seven).

Figure Seven: Level of Telecommunications Competition Worldwide



Privatization of the incumbent (usually fixed-line) telephone company into a competitive regime contributes to leveling the playing field for competitors, redirects government efforts towards policy and regulation, increases the efficiency of a major operator, and provides an additional avenue for private financing of investment.[26] It should be noted that, in an environment of reduced global appetite for investment in fixed-line operators, increased competition from mobile providers, and a rapidly depreciating value of incumbent operators, incumbents are proving more difficult to privatize. This suggests that a new approach may be required, emphasizing rollout and flexibility for investors in the sector over returns to the treasury (see GICT, 2004).[27]

Particularly important in a sector such as telecommunications is the ability to attract FDI. As we have seen, FDI has been the major source of private participation on telecommunications infrastructure projects to date. Despite this, a recent survey looks at restrictions to telecommunications FDI in fifteen Asian economies and notes fourteen of them have restrictions, ranging from 30 to 49 percent of total equity as a maximum foreign share (Ure ,2004). A similar picture is found around the world (see Table Eleven).

FDI restrictions not only place a maximum limit on potential foreign private investments, they can also deter such investments altogether. Ure (2004) reports that one foreign investor pulled out of a partnership investment in an Asian telecommunications company because "the regulations… made it very clear that we couldn't be in control—capped at 49 percent. That was the main reason we left." Complex ownership arrangements de-link management from facing investor risks and reduce foreign investor incentives for transfer of management expertise to the firm, thereby curbing effective, profit-oriented management. And lack of a clear policy for such investment prolongs negotiation, increases the risk for long-term partnership, and discourages future investments.

Table Eleven. Restrictions on Foreign Participation/Ownership of Telecommunications Service Operators, Selected Countries, 2003 (Percentage Allowed)

Country	Facility-based Operators	Spectrum-based Operators	Local Services Operators	Long Distance Service Operators	International Service Operators
India	49	49	49	49	49
Kenya	40	40	40	40	40
Malaysia	30	30	30	30	30
Mexico	49	49	49	49	49
Philippines	40	40	40	40	40
Poland	49	49	100	49	49

Source: Guislain and Qiang (2004).

[26] Given the strong relationship between competition and sector performance, it is unsurprising that fixed line privatizations that are packaged with a guarantee of monopoly or exclusivity periods, while as much as doubling a sale price, also slow growth in mainline rollout by 40 percent (Wallsten, 1999).

[27] Elements will include limiting bidder qualifications (Bulgaria recently sold 65 percent of its Telecommunications Company to a holding company rather than a strategic investor, for example), abandoning minimum bids and selling off all rather than some of the company.

Beyond providing the legal and practical opportunity to invest, it is clear that risks and returns drive private financing decisions in ICI as much as in other sectors. Here the evidence suggests that, in the right policy and regulatory environments, ICI investments can make considerable returns in every region of the world. Taking the example of the IFC's telecommunications portfolio, estimated returns are double the Corporation's average (World Bank, 2002).

Regarding returns, FDI restrictions are only one of a number of factors that can encourage or deter private investors in competitive telecommunications regimes by altering the risk/return equation. A recent analysis of private participation in telecommunications (see Box Three) suggests a number more. These include the stability provided by and associated with a WTO commitment in telecommunications.

Box Three: The Determinants of Private Participation Levels in PPI Investments

A recent paper examines private participation in telecommunications projects using the World Bank's PPI database.[28] The authors conclude that the following factors influence private participation:

- *Project size*. It appears that private players take a larger percentage of investments in larger projects, perhaps because of the transaction costs of becoming involved, or perhaps because of limits to public resources.
- *Wealth*. Private players tend to take a larger share in projects in wealthier countries.
- *Existing telephone infrastructure*. It appears that countries with low teledensity given income are more attractive to private participants—perhaps because this suggests pent up demand for telecommunications services in the market.
- *WTO commitments*. Six additional commitments to the WTO are associated with a 31 percent increase in private participation—perhaps because of the stability and certainty such commitments bring.
- *Greenfield over divestiture*. Private participants have a larger role in greenfield investments (a 21 percent larger share of the investment)—perhaps because of constraints on private ownership imposed during partial privatizations, perhaps also because of private operator preferences to enter markets with a clean slate.[29]

There is also weaker evidence that strong general investment climates and projects that predominantly involve coaxial infrastructure are more likely to attract private participation.

As of October 2003, 105 governments had made specific commitments in some or all aspects of the telecommunication sector under the WTO. More than 77 governments had committed to the General Agreement on Trade and Services to telecommunications regulatory principles which are considered today as "best practices" (Guislain and Qiang, 2004). WTO commitments will be an important signal to investors regarding not only reform, but the stability of that reform. A stable regulatory and policy environment is vital in telecommunications because of the high fixed costs associated with utilities. Sunk equipment costs (fixed costs excluding easily resaleable items such as land, buildings and vehicles) account for approximately 40 percent of total costs in Asian telecommunications companies—it is likely that the proportion is similar throughout the developing world (Ure, 2004).

[28] Doh, Teegen and Mudambi (2004).

[29] In addition, joint ventures attract more private participation than wholly owned firms. Principal investor state ownership is negatively correlated with private participation in the investment. Countries where there has been a general move towards privatization also attract more private investment.

A recent survey of strategic telecommunications investors in Asia which asked about the determinants of entry and exit decisions confirms the centrality of regulatory consistency (Ure, 2004). Nine specified risk factors that influenced such decisions were ranked by investors in approximately the following order of concern (highest to lowest): regulatory consistency, rate of return, quality of local partners, direct control, country risk, repatriation of profits, currency risk, the scale of the investment, and insurable risks.

A related important element of the WTO regulatory principles is to ensure the regulator's independence from operators in order to avoid conflicts of interest. This not only involves clear separation of the institution of the regulator from operators, but also of regulatory staff themselves—Ure (2004) notes cases where regulatory staff have accepted consulting contracts or even management positions from telecommunications operators.

Strong interconnection agreements are perhaps the most important element of the regulatory toolkit when it comes to ensuring fair competition—if competitors to the incumbent are to be made willing investors, they have to know they can compete on a level playing field. But this will also require, at the least, price caps for dominant incumbent services (and removal of price restrictions in competitive markets), arrangements for unbundling, and number portability to encourage competition by allowing users to change service providers without changing numbers.

A regulatory environment with the flexibility to reflect the greater costs of rural services in pricing regimes can also enable greater rollout, in particular through the regulation of interconnection between operators. The limits to this model have yet to be practically evaluated—for example, it is not clear if the model would work if the same operator owns both rural and urban networks. Nonetheless, there are some encouraging early cases. This is exemplified by the Chilean case, which allows operators in specified rural areas to charge higher tariffs (up to a regulated limit) and provides cost-related asymmetric interconnection rates. The interconnection regime gives rural operators access charges that are higher than those of urban operators. This creates significant revenues from incoming call traffic and the incentive to exploit demand for incoming calls. The largest Chilean rural operator derives 60 percent of its total revenues from its positive interconnect balance with urban operators, allowing it to recover costs and develop significant business opportunities from incoming calls. Colombia has also recently implemented a cost-based asymmetric interconnection regime for rural operators, and Peru is planning to do the same (Dymond and Oestmann, 2003).

Especially for smaller economies, regional cooperation through harmonized regulation will be particularly important to encourage cross-border investment programs including international backbone projects (see Box Four).

Box Four: Working Towards the Establishment of an ECOWAS Common Telecommunication Market

As part of its effort to promote regional economic integration, ECOWAS, supported by the World Bank and the Public Private Infrastructure Advisory Facility (PPIAF), has launched a program to develop a common framework to facilitate the harmonization of national telecommunication sector policies throughout member states with the ultimate goal of establishing a telecommunications common market within the ECOWAS region.

ECOWAS commissioned a telecommunication harmonization study, launched in February 2002 which provided a set of recommendations on the way forward for harmonization and was supported by subsequent Ministerial meetings in Accra, Abuja, and Lomé. This is being followed by a new exercise to provide a five year operational road map for harmonization, a regional roaming initiative, public-private consultation exercises, and capacity building initiatives.

As is made clear by survey and statistical evidence, however, investment decisions in the sector depend on far more than sector-specific policies and regulation—not least of which is the broader macro and institutional environment. Bureaucratic and policy issues are frequently highlighted as problems. These include cumbersome investment approval processes, weak investment authorities, outdated and inexperienced corporate legal systems, excessively complex and expensive systems for granting entry visas and work permits, excessive licensing schemes, poor tax administration and high tax rates, and complex foreign exchange controls and formalities. The avoidable costs of doing business vary considerably across countries—in Poland, contract enforcement difficulties, bribes, crime, and regulatory obstacles cost the same as eight percent of sales in surveyed companies—compare that to greater than 17 percent in Algeria (World Bank, 2005). But the top four constraints to investment rated by surveyed companies across 53 countries were policy uncertainty, macro instability, tax rates, and corruption.[30]

Poor legal institutions in particular are correlated with high levels of ownership concentration, low availability of external financing, narrow equity markets, and small debt markets. Countries with poor legal institutions see ratios of external capital to GNP that are approximately one half of the world average (La Porta and Lopez de Silanes, 1998).[31]

Finally, stimulating demand can also have a significant impact on private investment and rollout of services. As will be shown, the government can use its own demand for ICI to

[30] In countries that are attracting FDI, low international transactions tax rates are also an important determinant of the level of investment attracted, as are a friendly business environments. One estimate suggests that a 10 percent increase in the marginal corporate tax rate would lower the FDI-GDP ratio by about 0.2 (Gatanaga, Nugent and Pashamova, 1998). At the same time, lower taxes are not as important as lower non-fiscal barriers to entry. Other avoidable costs can be up to three times as important as taxes in ramping up investment costs.

[31] There is also growing evidence that FDI flows are responding far faster to short-term economic factors (Kozul-Wright and Rowthorn, 1998). Recent surveys of Japanese firms' decisions to invest abroad found a positive perception of FDI policy was a strong determinant of future plans to invest in a country and that there was also a strong positive relationship between low trade barriers and the likelihood that MNCs would enter (Kinoshita and Mody, 1997).

extend access, but it also has a role in providing ICI-enabled services, ICT training and a favorable environment for the development of ICT-producing and using industries.

8. Even with greater private involvement, gaps will remain

While the private sector can meet the great part of developing country demand for telecommunications services, it is likely that the private sector alone, even if supported by a strong regulatory institution that fosters fair competition and a broader investment-friendly climate, will not meet demand for all information and communication infrastructure services that are economically efficient or socially acceptable. This is especially true when looking forward to a world where narrowband has given way to broadband, where technology and service-specific licenses and regulation are replaced by class licenses, and where technological and service neutrality is largely governed by competition policy. The nature of a rapidly changing sector is that the exact roles for the public and private sectors are likely to be fluid, changing, and context-specific.

For example, geography is still a key determinant of communications costs and functionality. A user in an area of low demand density because of sparse population will still tend to have proportionately higher communications costs and lower available functionality. This phenomenon is firmly rooted in the basic cost economics of networks. Telephones in rural areas cost significantly more per subscriber not only because each connection is further from the next, but also because economies of scale in switching cannot be achieved. Under such circumstances, rural areas may not have access to ICI that would generate significant economic and social returns.

Basic reform may also leave gaps in national backbone networks. These are typically long-term investments with significant sunk costs and they have not always been able to attract adequate levels of private investment. The long-term rate-of-return profile of these projects makes them less attractive to private operators, which means they may require public support.

Cross-border facilities, where the transactions costs and timing uncertainties of multi-jurisdictional investments provide a daunting extra challenge to investors, may be particularly under-funded and may be a particularly suitable vehicle for government intervention. A growing number of SSA countries, governments, regional organizations, as well as private sector operators have identified building regional backbone infrastructure as a top priority for improving connectivity in the region. Several regional backbone infrastructure initiatives are currently under discussion across the region, notably the East Africa Submarine Cable System (EASSy) summarized in Box Five.

Box Five: Accelerating Connectivity in Eastern & Southern Africa

In the longer run, the benefits of improved connectivity will result in an increase in the attractiveness of SSA to foreign investors, and accelerated economic and social development. The World Bank and its development partners are supporting a number of projects aimed at linking East and Southern Africa countries to one another and to the rest of the world by 2010. To meet this objective, the following must be achieved: close the gap in optical submarine cable loop around Africa; connect all land-locked countries to submarine cable systems and; establish an integrated, continent-wide broadband ICT system.

The East Africa Submarine Cable System (EASSy) is one of the projects designed to contribute to cross-border connectivity throughout Africa. EASSy is a fiber optic cable project proposed to connect coastal countries in East Africa, including Djibouti, Kenya, Madagascar, Mozambique, Somalia, South Africa and Tanzania. These countries would serve as the "EASSy anchor countries." In addition, 15 other East African countries have expressed interest in connecting to EASSy through terrestrial means.

EASSy will help Africa move towards self-sufficiency and decrease the continent's dependency on outside countries for telecommunications services. Instead of paying high charges for international connection through a transit point, operators in the region can establish direct connections, promising a substantive decrease in their operating costs for international telecommunication.

In order to secure maximum benefits from these initiatives, restrictions and bottlenecks on international access need to be addressed, and World Bank Group support would be predicated on the international telecommunications segment being open to competition. The exact nature of World Bank Group involvement is under discussion, but it may involve elements such as guarantees, IFC investments in private operators and World Bank support for technical subsidy elements.

Source: GICT Africa Roadmap

Along with backbone investments, there may be under-investment in broadband rollout due to a little-understood risk profile and a proliferation of different technologies. Finally, countries where security uncertainty is so high that investors are deterred from even very profitable ventures may also face considerable difficulties in attracting sufficient private investment to meet immediate needs for ICI in support of reconstruction efforts. In this case, the potential costs of absent service delivery may make the risk of direct government investment in the sector worthwhile in the short-term (see Box Six on post conflict environments).

Box Six: Public Financing in Conflict and Post-Conflict Environments

Recently, the private sector has shown interest in investment in the telecommunications sector even in the immediate aftermath of conflicts, (Iraq and Afghanistan have both already attracted vibrant private investment in the mobile sector, for example). Furthermore such environments usually also involve limited capacity on the part of the incumbent to roll out a network, suggesting that private contractors will have to be employed to construct and potentially operate the network regardless of ownership. When conditions nonetheless dictate public operation and ownership (due to continued high political risk, for example), this should be bundled with a reform program and sustainable strategy to open the sector to private participation and competition as soon as possible, to attract private financing in a sector that is frequently the first to see significant foreign direct investment. A US$22 million project carried out by Afghanistan's Ministry of Communications and supported by the World Bank combines these elements. The credit has three components, covering Government Communications, Ministry of Communication Institutional Capacity Building and Postal Sector Support.

(continued)

- **Government Communications Component:** The component is financing the turnkey procurement, installation and 36-month operation of a communications network that will extend coverage to Ministries, the Central Bank and the Presidential Palace in Kabul as well as Provincial Capitals. The project will also pay for sufficient training of AfghanTel staff to provide them with the capacity to operate the network after it is handed over. From that point onwards, the communications network operator (AfghanTel) will be under standard regulatory oversight as a commercial (government owned) corporation. From early in the process, the Ministry will endeavor to ensure cost-recovery from users of the network to ensure sustainability.
- **MoC Institutional Capacity Building Component:** The component is supporting (a) the Ministry's transition towards a policymaking role through equipment purchase, project management assistance, consulting assignments and training; (b) separation of Ministry's operational functions from its policymaking units into a corporation (AfghanTel) through consultant support; and (c) development of regulatory capacity through equipment purchase, training and consultant support.
- **Postal Sector Component:** The project supports the separation of Ministry's policy and operational functions in the postal sector and the development of the sector through equipment purchase, training and consultant support.

As well as extending government access, the project and related policy dialogue have played a role in the dramatic rollout of access by two private sector providers of mobile services, who have invested more than US$130 million and rolled out services to 170,000 mobile subscribers across the country.

9. Some investment gaps can be filled with pro-investment policy and regulation

Before using scarce public resources, governments and regulators should exhaust available non-investment avenues to extend access. This can be achieved not least through license awards and privatization design that go beyond ensuring fair, pro-access competition (discussed in Section Seven) to use the natural scarcity of spectrum and the government-owned assets of incumbents being privatized as a lever to create faster sector growth. One recent study suggested that countries which focused on consumer benefits to liberalization saw fixed line growth of 72 percent over the three years following reform as opposed to 25 percent in countries that emphasized government receipts from privatization and long distance price declines of 33 percent as opposed to 14 percent in countries that emphasized government receipts (Beardsley et. al. 2002).

Regulators should follow a strategy of aggressive all-service licensing of operators willing to provide services in currently uncovered areas. And for license tendering processes, build-out targets are increasingly used as an important, sometimes primary, bid evaluation criterion, alongside the bid price. Examples include:

- In Uganda, the Second National Operator's bid evaluation criteria included a network rollout plan in addition to the bid price.
- In India, the regional local fixed operator bid evaluation criteria gave weight to rural coverage plans, but only 15 percent compared to 72 percent weight of the amount of license fee offered.

Under these models, investment in the sector, rather than short-term fiscal benefits, is treated as a major or primary consideration—ensuring a higher rate of investment over the long run (Dyamond et. al., 2000). At the same time, licenses need to be designed

carefully to ensure that the investments encouraged under the scheme will actually help meet access targets. One important element of design in this case is technology neutrality (see Box Seven).

Box Seven: Technology Neutrality in Investment Commitments

The danger of technology-specific regulation and policymaking in the sector is well illustrated by Thailand's experience with rollout targets. Two new fixed-line franchises in the country were obligated to install 4.1 million fixed telephone lines between 1993 and 1997. Much of this capacity remains unused because fixed services are more costly and less convenient than the mobile services which rapidly expanded over that period to cover the same potential subscriber base. Overall, only 69 percent of the fixed lines in the country are now used (and a similar situation has developed in the Philippines, where only 50 percent of installed fixed lines are in use). Had the government focused on the goal of access rather than the technology of fixed-line provision, the sector and the country could have used scarce investment resources to meet access targets more efficiently.

10. Some gaps can be covered by leveraging the government's role as consumer and transport and utility operator

Turning to the role of government financing, the government is itself a major consumer of communications services, and it can use this role not only to improve the delivery of government services, but to extend access to previously unserved communities. Public sector networking requirements may extend beyond the capital to border posts, regional and local government, schools and hospitals, for example. If private operators are paid to provide this service to government facilities in remote areas, it is likely to be in their interests to serve local people as well. In Mongolia, a World-Bank backed project supported the Ministry of Finance to link up rural banks. The private company that provides this service using satellite technology aims to extend access to other users including nomadic communities (Ure, 2004). [32]

Because governments remain in the business of providing a number of other networked services, there is also the opportunity to leverage those networks to reduce the economic cost of backbone build-out. The potential to roll out ICI alongside other networks such as power, rail, water, pipelines, and roads is a significant one. In many cases, network operators have already built private telecommunications networks along these rights of way with capacity that can be leased to private telecommunications companies. In the case of energy, there is the added potential to transmit communications signals over power lines. The economies of scope of such investments may significantly reduce the cost of developing backbone capacity for information infrastructure. For example, railway companies around the world can meet their communications needs by making

[32] While governments may have security concerns with running traffic through privately-owned networks, the use of virtual private networks (where possible), rather than the construction of a parallel dedicated public infrastructure is likely to be as secure and more efficient. Single-purpose networks are difficult to justify in financial and economic terms. At the same time, it is important that decisions on the level of usage of ICT applications in the provision of government services be demand-driven by sectoral considerations rather than supply-driven by a rollout initiative. Given these two constraints, networks to provide services to applications users including government should be open and private rather than closed and government-owned–ensuring the maximum rollout of services at the minimum cost

available their rights of way in exchange for communications services. Looking more broadly at the opportunities for scope economies, sixty-seven percent of the costs of laying fiber cable are taken up by the cost of digging the trench in which it lies. These costs can be considerably reduced if trench-digging occurs as part of a transport or utility project. Utility rehabilitation and transport construction projects could include ducting for telecommunications cables that can be provided to telecommunications companies—perhaps even providing a significant source of revenue for the operator.

Such opportunities should be actively grasped, if the policy and regulatory environment covering infrastructure sectors will allow for the investment to further the private, competitive provision of affordable telecommunications services (for example, demanding separate and transparent accounting of investments and revenues, as well as corporate unbundling to help ensure that there is no cross-subsidy across businesses).[33] ,

11. And some gaps may require government-supported access initiatives

Even after taking advantage of policy and regulatory levers as well as using its own demand as a lever to encourage access, there may remain a role for direct government subsidy of rollout initiatives. Chile has provided a model for providing government support while still exploiting entrepreneurial talent. The country has introduced a system of auctioning subsidies to pay for rural telecommunications rollout. In 1994, the country set up a limited-life fund to support the provision of the first payphones to remote and rural areas. Companies were asked to bid for the lowest subsidy that they would accept to provide service. Within two years, the fund had achieved 90 percent of its rollout objectives using only about half of its US$4.3 million budget—largely because it received bids to provide service with no subsidy to about half of the chosen locations. Just over US$2 million in public funds had leveraged US$40 million in private investment to install telephones in 1,000 localities at about ten percent of the costs of direct public provision (Wellenius, 1997).

The subsidy auction model might also work to support the rollout of privately owned and operated backbone networks within and across borders into areas currently operating in a low-bandwidth environment (these networks would allow the proliferation of local points of presence for Internet access, for example). Any such rollout schemes should ensure open, equal access to facilities to preserve a level competitive playing field in the sector. Indeed, some considerable part of current 'undersupply' of backbone and international connectivity may well be connected with limited competition.

Other mechanisms to speed rollout include low interest operator loans to encourage operators' network build-out in most challenging regions, provided by governments or

[33] One example of this approach in action is Bulgaria's cable operator CableTel which, in partnership with one of the country's mobile operators MobilTel, is building a fiber-optic line from Sofia to Kulata, providing international connectivity in competition to that provided by Bulgaria's fixed telecommunications operator, BTC. This 270 km long line is part of an ambitious project to build a national network of 1,800 km of fiber-optic cable.

bilateral and multilateral aid agencies. High-cost areas create large up-front costs for the operators, and thus institutional loans to help finance the initial capital investment costs would be useful, especially as domestic capital markets in developing countries tend to be weak.

Micro loans for phone shops or other retailers can support retail services extension. To encourage network utilization, existing operators can set up schemes to help finance diverse retail activities. The prerequisite, however, is that the regulatory regime must not prohibit reselling of services. The traditional approach is to franchise a telephone line to private individuals or small businesses and to pay a certain percentage of commission to the franchisee. This way, operators can often secure higher revenues than from a public phone because the private incentive tends to keep lines working well. Small loans may be granted to set up operation or to enhance services to include fax or Internet service, for instance. In Delhi, the State Government has taken this broad approach by starting a program to offer subsidized loans (at a 13.5 percent interest rate) to upgrade existing public call offices to cyber cafes providing Internet access.

In Bangladesh, Grameen Phone, an operator offering traditional cellular services in urban areas, gives loans to low-income women entrepreneurs in rural areas to provide payphone services based on cellular technology. Community usage drives up airtime, and the entrepreneur is typically able to repay her loan within a few months. This has a significant impact on the income of affected rural women.

There have been some cases beyond post-conflict where direct government investment (perhaps particularly at the sub-sovereign level) has been used in broadly private, competitive environments to extend access, in particular to broadband services. One example is discussed in Box Eight.

Box Eight: Andhra Pradesh Rolls Out Broadband

The Indian state of Andhra Pradesh has a number of operators providing broadband services to parts of the state. However, there is limited access outside major urban areas. In order to overcome this access gap, the state government issued a tender to provide gigabit-level broadband services to 40,000 government offices and a 100 Mbps connection in every one of 22,000 villages across the State. Andhra Pradesh will also provide an equity investment to the winning bidder worth approximately six percent of total investment costs (estimated at US$92m). The (predominantly private) consortium that won the tender is guaranteed revenues from government use, which will include an extended range of government-to-citizen e-services delivered through 6,000 rural IT kiosks as part of a US$162m e-government project. It will provide private 2 Mbps broadband access for US$2.30 a month.

Andhra Pradesh combined a number of elements to minimize the need for public investment while meeting its access objectives—a competitive selection process, aggregating government demand for broadband services to create an attractive market, and development of online services to further leverage demand.

Some municipalities in Europe and the United States have gone further, and rolled out publicly-owned and operated broadband networks. It should be noted that, even in the

US, these investments have frequently seen low or negative financial rates of return.[34] Furthermore, the economic rationale for majority public ownership of such networks is not clear. Nonetheless, it may be a model worth examining further for some developing countries.

In such a rapidly developing market, it is likely that different approaches will be suitable in different cases. Overall, any approach to extending access that does not overly interfere with (and preferably enhances) the operation of a competitive, predominantly private market, that minimizes the use of scarce government resources as a last-resort option, and that demonstrably meets a clearly defined social or economic goal should be considered.

It should be noted that priority in supporting access schemes should go to basic services. Indeed, (a) access to basic telecommunications services may be more easily achieved than access to advanced services (such as Internet); (b) basic services are more relevant to poverty reduction as they can be more easily used by the excluded, including the very poor and the illiterate; and (c) basic services have a strong record in promoting development objectives. Clearly, some more advanced developing countries have already met basic voice access goals, for example, and in these cases it may be appropriate to move on to more advanced services.

Regarding "last mile" access support (from the backbone to the community or household), a solid understanding of the intended beneficiaries and their potential communications needs in design is vital to ensuring that support meets real rather than perceived demands. Communities are increasingly involved in the design of public access programs (through surveys and participatory design techniques) as well as in the monitoring of such programs and even, in some instances, in the provision of public access through local nonprofit organizations.

Involvement of intended beneficiaries is particularly important if telecommunications rollout is to be combined with access to advanced services such as the Internet. As with telecommunications networks in general, it is likely that telecenters will have a higher economic rate of return if they are multipurpose. Sustainability and economic returns require that there be enough demand for the services to be provided through the access point. At the same time, the implementation record for donor-supported multipurpose telecenters of the type suggested is very weak. There have been many failures, with little community interest in the services provided and very low usage rates. The model may prove to be sustainable in the long-term, but it is likely that this will involve concerted involvement of government and stakeholders on the recipient-side, as well as cross-sectoral involvement to develop a model that provides quality, affordable services actually demanded by the target population.

Again, the successful rollout of all access schemes would normally require that the market has already been effectively liberalized and that no operators have offered to

[34] In 1998, Ashland, Oregon, initially projected a ten-year return from its municipal network of US$3.8m, it is now projecting losses of US$6.9m) (Titch, 2005).

provide the services on commercial terms. Government financing should not support rollout in an unreformed or nonreforming environment because it is probable that the economic rate of return to such investments under those circumstances will be considerably lower. For example, in unreformed markets, public investment resources for access will have to be used where private investment, under the right regime, would provide the service without subsidy.

Well-designed Universal Access Funds that support the type of public access scheme discussed above can play a vital role in LDCs by encouraging equitable investment in ICTs. In so doing, they can leverage private sector investment to achieve universal access goals. The typical sources of revenue for such universal access funds include one or several of the following:

- Interconnect levies
- "Virtual fund" transfers
- Operator revenue contribution (often through a user fee)
- License or radio frequency fees
- Government budget
- Seed finance by development bank or agency

In the wealthier developing countries where most funds to date have been created, the most frequently used fund collection mechanism has been imposition of a levy on telecommunications operators, usually a certain percentage of their annual revenues. This generally varies between 1 and 2 percent, as illustrated by the cases of Peru and the Dominican Republic, for instance. In Guatemala, 70 percent of the revenues from spectrum auctions go to the fund (Dyamond et. al., 2000). In Chile, the fund is financed from direct government budget allocations. This is also the planned approach in the Philippines.

Especially in poorer and more population-sparse countries, funding universal access from a revenue or spectrum levy alone is unlikely to be practicable in the short run (because of the greater per-subscriber cost of widespread access), and the use of government budgetary resources may become necessary, perhaps financed by donors. The World Bank's recent telecommunications project in Nicaragua includes a small portion of seed financing for the rural development fund, for example.

Currently, the usual practice for universal access funds is to place them under the Ministry of Telecommunications or within the regulator. It may be that other designs could maximize the development impact of funds while insulating fund managers from pressures to misallocate funds on short-term political grounds.

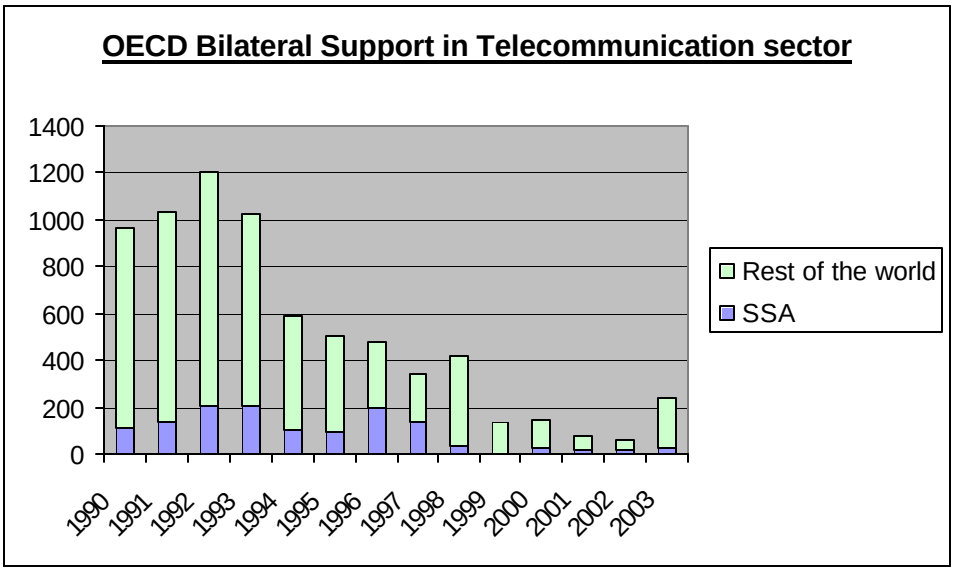
Based on cost estimates from the Chilean universal access scheme, one recent study (Keramane and Kenny, 2005) broadly approximated that the order of magnitude costs for a subsidy mechanism to provide worldwide universal access at the Chilean level would be less than US$6 billion, with a 'financing gap' (based on the likely level of funding available from operator levies) of approximately US$2 billion.

12. Donor community financing plays a relatively small role in overall financing

It is worth noting that, in volume terms, international donors and financial institutions have played a relatively small role in investments in ICI. While donor investments can have an important catalytic effect, it remains the case that the great bulk of external financing to developing country telecommunications sectors has been, and will likely remain, private flows.

On the public investment side, OECD bilateral support and multilateral support have both declined over the course of the 1990s. For bilaterals, public investments are below one fifth of the level of the early 1990s (see Figure Eight).

Figure Eight



Turning to international financial institutions' support for private investment, this has grown considerably over the course of the 1990s. Nonetheless, their role remains small compared to total financing in the sector. Of 123 telecommunications projects spanning 23 countries listed in a recent analysis of foreign private investment in Asia, only two were listed as involving an MDB (Ure, 2004). Only sixteen percent of the projects listed in the PPI database over the 1990 to 2002 period involved an international financial institution (see Box Nine).

Box Nine: The Role of IFIs in Financing Private Telecommunications

Over the 1990 to 2001 period, developing countries attracted US$279 billion of private investment into telecommunications. This is 100 times the total IFC financing for telecommunications over that period (US$3.1 billion between 1990 and 2001). Looking at other IFIs, the European Bank for Reconstruction and Development (EBRD) has been a comparatively significant player in its region's telecommunications reform program. Since 1992, it has invested in telecommunications in 21 countries as well as regional projects with a commitment of 1.4 bn Euros. The EBRD appears to be the exception, however. The Inter-American Development Bank (IADB) appears to have invested US$10 million in communications projects between 2000 and 2003 in seven countries, but the bulk was to the Dominican Republic for a broad information society project, suggesting a limited role in telecommunications infrastructure financing. The IADB's private-sector arm, the Inter-American Investment Corporation, appears not to have made a telecommunications investment in the 2002 to 2004 period. The Asian Development Bank appears to have had only one major telecommunications investment project since 1996, a US$9.5 million loan to the Maldives. The most recent available data from the African Development Bank suggests communications investments worth only US$54 million over a thirty-year period.[35]

According to the PPI database, the IFC was involved in 36 PPI telecommunications projects over the 1990 to 2002 period, EBRD in 27, EIB in 17, and PPI deals and others in 18 deals. MIGA guaranteed 12 projects. Annual average telecommunications investments from the regional MDBs sum perhaps US$120 million, concentrated in Eastern Europe. IFIs and bilaterals are somewhat more active in guaranteeing the political risk of telecommunications projects in the developing world. In 2003, MIGA was involved in guaranteeing three telecommunications projects (all in Africa) with a combined value of US$90 million. OPIC financed or guaranteed US$68.5 million in four deals. Nonetheless, compare these sums to over US$30 billion per year in private investment in telecoms in the developing world, and it is clear that the role of IFIs, while important, can only be seen as catalytic rather than driving investments in the sector.

Because of the size of the sector, the scale of private investment will likely continue to dwarf public flows in the future.[36] Having said that, it is important to note that donors and international financial institutions can play both catalytic and counter-cyclical roles. For example, during the post-2000 slowdown in private flows to developing market telecommunications companies, the IFC's telecommunications investments in Africa increased from an average of US$5.4m between 1996 and 1999 to US$54.5m between 2000 and 2003 .

13. But the catalytic role for donors and the WBG can be significant

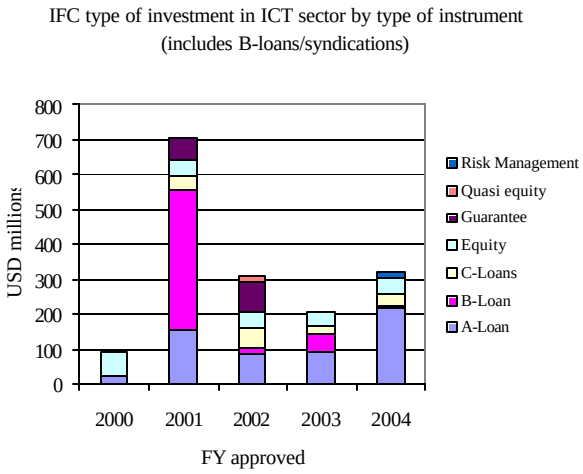
Regarding the World Bank Group, an accompanying report *The World Bank Group Financial Instruments and their contribution to the Information and Communication Technologies landscape* lays out in detail the range of available instruments within the Group for supporting ICT investment and reform, as well as the scale of the Bank Group's involvement.

[35] Sources: annual reports on the web.

[36] Telecommunications revenues in 2003 were likely to top 44 billion dollars in Latin America alone –that one region sees telecommunications revenues larger than total worldwide annual investments made across all sectors by the IFC, the World Bank and the Inter-American Development Bank. Pyramid data (http://www.infodev.org/projects/internet/375pyramid/index.htm).

Direct IFI support for private sector investments has and should continue to focus on areas where the private sector needs the country knowledge and risk mitigation instruments of groups such as the IFC or EBRD. Examples of IFC activities and drivers for project success are listed in Box Ten. IFC is the primary provider of financing to the private sector ICI industry in the WBG— through loans, equity, quasi-equity, risk management products and guarantees. IFC further offers syndications (or B-loans), through which the IFC leverages its presence in the markets for resource mobilization. IFC investments in the last 5 years totaled of US$1.2 billion USD in commitments, and B-loans have amounted to US$474 million (see Figure Nine). The catalytic role of this investment is suggested by the fact that each dollar of IFC investment attracted US$8.7 of outside financing in the sector in 1999, and each $1,000 of IFC investments supported the rollout of an average of 14 new lines (World Bank, 2002).

Figure Nine – IFC investments in the ICT sector by type of instrument



Box Ten: IFC Investments in Telecommunications

In Bangladesh, IFC supported a US$150 million expansion of nationwide mobile phone network (GrameenPhone). IFC committed a US$30 million loan to the project in 2004. The project demonstrated a high economic and development impact because penetration rates of all forms of telecommunication services are very low in Bangladesh, and considerable pent-up demand exists. In addition, IFC was able to provide financing on terms and maturities not otherwise available from local and international capital markets, and helped mobilize financing from the Asian Development Bank and Norfund. Finally, the project had strong sponsors, including the majority shareholder Telenor, the largest telecommunications group in Norway, and largest minority shareholder Grameen Telecom, an affiliate of Grameen Bank, the internationally recognized bank for the poor with extensive rural operations. Although the regulatory environment was in transition in Bangladesh and was not without risk to investors, the commitment of the Government to the reform of the sector was evidenced by its work to separate its policy and operational roles in the sector, and strengthen policy and regulatory capacity. IFC's belief that the regulatory environment would continue to improve in the country was also an important contributing factor to making the investment.

In Jamaica, the IFC supported a US$56 million expansion of nationwide mobile phone network (Mossel). IFC committed a total of US$20 million in debt and equity financing to the project in 2003. IFC was able to provide financing on terms and maturities not otherwise available from local and international capital markets. The project has a strong sponsor, Digicell Caribbean Limited, whose management had previously launched a successful mobile company in Europe. Jamaica benefits from a largely liberalized telecommunications sector and a fair and transparent regulator. This has been a key factor in the strong growth in the telecommunications industry, and in attracting IFC investment.

In Nigeria, the IFC supported a US$1.25 billion expansion of nationwide mobile phone network (MTN). IFC committed a total of US$100 million in debt and equity financing to the project in 2004. The project demonstrated a high economic and development impact because Nigeria's teledensity is one of the lowest in the world. In addition, IFC was able to provide financing on terms and maturities not otherwise available from local and international capital markets. The project has a strong sponsor, the MTN Group, a leading publicly traded South African mobile operator with over five million subscribers. Nigeria is moving towards a largely liberalized telecommunications sector and has a fair and transparent regulator. This has been a supporting factor in the strong growth in the telecommunications industry and a huge increase in mobile subscribers in particular, and in attracting IFC investment.

Along with IFC, the Multilateral Investment Guarantee Agency (MIGA) promotes foreign direct investment by providing political risk insurance (guarantees) to investors and lenders, and by helping emerging economies attract private investment. In the past five years MIGA has committed US$666 million USD in the ICT sector, which represents 21 percent of the WBG's portfolio in the sector. The agency has issued 55 guarantees for 25 telecommunications projects over the past 13 years, with coverage ranging from US$1 million for a satellite communications system in Uganda to US$230 million for a cellular telecommunications project in Brazil (see Box Eleven). Reinsurance and coinsurance arrangements with public and private insurers have enabled the agency to substantially expand its activities in this sector.

Box Eleven: A MIGA Guarantee

In 2002, MIGA provided guarantees to Investcom Holding S.A., of Luxembourg, and to its wholly owned subsidiary, Investcom Global Ltd., of the British Virgin Islands (together referred to as Investcom), totaling US$8.06 million, to cover their US$9.9 million investment in Spacetel Benin S.A.R.L. (Spacetel). Investcom is owned by Lebanese investors. MIGA's support represented its first for a project in Benin. Spacetel is installing a new GSM mobile telephone network in the country, which suffers from a severe shortage of reliable telephone lines—the 1999 teledensity level of 0.65 percent was among the lowest in the world. This project helped increase teledensity and improve connections, voice quality, and clarity, and was expected to be particularly beneficial to the local business community. By 2004, mobile teledensity was already above 4 percent of the population.

The goal for donors working with the public sector should be to use the limited resources they have available to generate the maximum development impact from aid. As with government intervention, this suggests the highest return is likely to be in the support of the reform and institution building agenda—support for the development of policies, laws and regulations as well as policy and regulatory capacity and institutional reform that foster private, competitive provision. The major instrument for World Bank lending support of sector reform is the technical assistance loan, an example of which is outlined in Box Twelve.

Box Twelve: A World Bank Technical Assistance Loan

In 1994, the World Bank supported the privatization of two telecommunications companies in Peru with a technical assistance loan which provided support to the transaction. In the aftermath of privatization, the quality of service, access by lower income populations, and teledensity all improved dramatically as both local and foreign private investment flowed in and employment increased in the sector. The number of fixed lines increased over 165 percent in five years, the number of mobile lines went up from about 20,000 to nearly half a million. Employment in the sector more than doubled as did the number of localities with access to telephones. The number of public phones increased by a factor of six. Access to the poor, in particular, increased (Grace et. al. 2000).

There is also an important role to be played in supporting access initiatives—both through technical and financial assistance. To date, World Bank investment support has concentrated in supporting output-based initiatives such as that in Uganda (see Box Thirteen) and in post-conflict situations (see Box Five). The Bank is also actively considering investment involvement in cross-border backbone rollout in Africa (see Box Seven). The World Bank (i.e. IBRD and IDA) has a range of instruments to support such interventions including technical assistance and universal access funding, and IBRD/IDA commitments in the sector have amounted to US$851 million USD in the past five years.

Box Thirteen: The Output-Based Aid Approach to Universal Access Funds Disbursements in Uganda

Uganda faces a number of challenges in achieving universal access, with a per capita income of about US$300 and a rural population of over 80 percent. Uganda began introducing sector reforms in 1996 and is reputed to have achieved one of the most competitive markets in sub-Saharan Africa. In 2001, a Rural Communications Development Fund was created under the supervision of the Uganda Communications Commission, collecting annual contributions from all sector players in the amount of 1 percent of direct retail service revenues. Since 2003, the fund has launched and successfully implemented small pilot projects involving the private provision of about 70 public phones in underserved rural locations, 20 Internet points of presence in district capitals, 22 Internet cafés, 33 ICT training centers, and 26 district information portals.

The World Bank is providing technical assistance for the definition of nationwide projects for public telephony, Internet points of presence, and telecenters, as well as regulatory instruments, institutional arrangements and bidding documents. The World Bank is also providing US$5 million in capital subsidy (with the potential for an increase), which will finance over 80 percent of the subsidy requirement for these projects. The first public telephony project, involving private provision of over 800 public phones in underserved rural areas, and a second project involving the provision of 32 Internet Points of Presence in district capitals are being launched for implementation during 2005.

WBG GICT Africa ICT Strategy, 2004

As well as investment loans, the World Bank provides Development Policy Loans—quick-disbursing assistance to countries with external financing needs to support policy or institutional reforms in a sector or the economy as a whole. They are typically linked to government-led reform programs, and thus support the policy and institutional changes needed to create an environment conducive to sustained and equitable growth (see Box Fourteen). While Development Policy loans were originally designed to provide support for macroeconomic policy reforms—such as in trade policy and agriculture—over time, they have evolved to focus more on structural, financial sector, and social policy reform, and on improving public sector resource management.[37] ICT components accounted for US$85 million of Development Policy loans in 2001, dropping to under US$25 million in FY2004. Box Eleven provides an example of such an operation.

The World Bank also provides a guarantee instrument, although it has not often been applied to the telecom/ICI sector, with the exception of the partial credit guarantee that was applied to the Jordanian Telecom bond issuance— a project approved in FY1994 and closed in FY2001

[37] Development Policy operations now generally aim to promote competitive market structures (for example, legal and regulatory reform), correct distortions in incentive regimes (taxation and trade reform), establish appropriate monitoring and safeguards (financial sector reform), create an environment conducive to private sector investment (judicial reform, adoption of a modern investment code), encourage private sector activity (privatization and public-private partnerships), promote good governance (civil service reform), and mitigate short-term adverse effects of development policy (establishment of social protection funds).

Box Fourteen: Policy Lending in Telecommunications

Morocco enacted a new Telecommunications Law in 1997 which enabled competition, established an independent regulatory body and allowed for the privatization of Itissalat-al-Maghrib (IAM), the state-owned monopoly. In 1999, the World Bank approved a US$101m Sector Adjustment Loan covering telecommunications and posts designed to encourage the growth of competition, the development of capacity in the regulator and the privatization of IAM. In 1999, the Moroccan telecommunications regulator successfully issued a second Global System for Mobile (GSM) license for US$1.1 billion to a consortia led by Telefonica and Portugal Telecom. Introducing competition has energized the performance and increased the value of IAM. The partial sale (35 percent) of IAM in 2001 (to Vivendi, France) raised US$2.3 billion. Furthermore, in anticipation of the launch of services by its new competitor, IAM reduced the prices for mobile communications by roughly 44 percent and increased its customer base by 75 percent in 1999. By December 2003, there were 7.7 million mobile subscribers in Morocco representing 87 percent of total subscribers and a penetration of 26 percent.

Finally, the World Bank Group also administers programs and Trust Funds (TFs) on behalf of donors which can support technical assistance and pilots. Examples include the Public-Private Infrastructure Advisory Facility (PPIAF) or InfoDev. PPIAF, InfoDev and other TFs' support to ICT has amounted to a total of about US$70 million USD over the last 5 year. Box Fifteen discusses an example of a trust-funded activity.

Box Fifteen: World Bank-Administered Trust Funds at Work

In 2004, PPIAF supported Regulatel, a grouping of Latin America's telecommunications regulatory bodies, to examine Universal Access for telecommunications services in the region. The US$299,748 project will foster the adoption and implementation of universal access programs for telephones, ICT services, and telecenters in Latin America that are consistent with a best practices checklist and methodology developed in cooperation with Regulatel.

Which World Bank Group instrument is used in each case depends very much on circumstances. As a general rule, IFC investments in the sector occur wherever there is an opportunity to pursue a project that promises suitable financial and economic returns given the risks associated with that project. MIGA can guarantee political risk in any of its member countries, assuming the project meets certain minimum development standards.

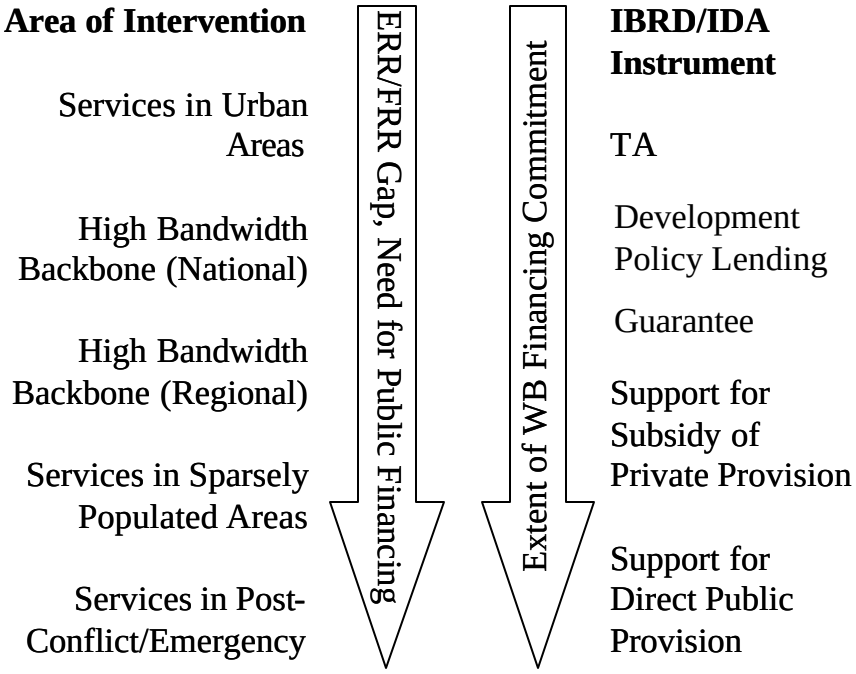
Regarding World Bank support, if requested by its client governments, the Bank stands ready to offer a range of support from technical assistance to direct investment support. Significant levels of support may be made available if the telecommunications sector is highlighted as a priority in country Poverty Reduction Strategy Papers and World Bank Country Assistance Strategies.

As a general rule, Bank support for investment in the sector follows the same broad principles that underlie all World Bank lending in general:

- Is there compelling evidence that the investment will make a high economic rate of return, justifying expenditure of scarce public resources on ICI?
- Is there compelling evidence that the private sector, in a sector environment that is plausible to imagine in the country, would not or is not meeting these investment needs alone?
- Is public sector financing the most appropriate mechanism to overcome this market failure (as opposed to regulatory methods, for example)?
- Does the method of investment ensure the maximum efficiency and minimum use of public resources to achieve the desired development objective, i.e. leveraging private financing and removing bottlenecks and sector constraints to accelerate the transition toward competitive and well-regulated markets?

Again, as a rule, this suggests that investment support is likely to be more appropriate in reformed, competitive environments where there is evidence of a significant economic rate of return to the investment but little apparent appetite from the private sector. Recently, as we have seen, the World Bank has found this to be the case in post-conflict environments and for service provision in sparsely populated areas. In addition, the World Bank is evaluating the economic case for investment support for high bandwidth backbone and broadband projects. The more significant the gap between the economic and financial rate of return, the greater the need for public financing, and the more likely that a World Bank investment instrument would be a suitable intervention. Figure Ten suggests the progression from potentially low justification for public funding to high justification, and the associated expansion in the range of IBRD and IDA instruments that might be appropriate to support rollout of ICI.

Figure Ten: Areas of Intervention and IBRD/IDA Instruments



A number of other factors would have to be taken into account. Exceptions might include meeting the special needs of small island states, and a potential role for transition and restructuring support for publicly owned fixed-line providers. Furthermore, the nature of the service to be provided may also impact the appetite for World Bank support—for example, there is likely to be greater interest in financing rollout of basic services which are likely to have a higher direct impact on the poor than advanced services. To emphasize, however, the appropriate instruments for particular interventions will be decided on a case-by-case basis.

Given the range of existing instruments available to support technical assistance, policy reform, and investment support in the area of ICI for development within the World Bank Group alone, it might be felt that there is no need for additional instruments. The greater need may be to (a) persuade recipient governments to prioritize use of the existing instruments for ICI development and (b) encourage donor governments to provide additional resources to support existing ICI-specific instruments.

There may also be a need for better leveraging across instruments—for example, tying World Bank subsidy support for rollout programs to IFC investment support in the operator which provides service. Leverage could also be increased by taking a broad view of sector constraints—intervening to expand access to local financing, for example.

If the development community felt that there was a need for a new or expanded global instrument to support more rapid rollout of ICI in developing countries, funding that allowed

for rapid technical and advisory support to further the reform agenda and the design of subsidy mechanisms to roll out access might be a suitable vehicle (see Box Sixteen).

Box Sixteen: A New Global Instrument for ICI Rollout?

As access to information and communications services is directly related to the extent of sector reform (and competition, in particular) in the country concerned, the highest impact increase in donor support to ICT may very well be in the form of increased resources for support of sector reform. Today, many countries (especially the poorest) are reluctant to borrow for such support, and are seeking flexible, rapid-response grant support. It is possible to envision Technical Assistance funding to specifically assist countries with reform and capacity building in this area. The fund could have several windows:

- a window for poorer countries— LDC, SSA, small islands
- a window to develop capacity building and technical assistance for regional integration
- a narrower window for more advanced economies (to support the development of innovative mechanisms, out-of the box thinking)
- a window specifically for developing innovative financial schemes
- possibly, a window for seed money

The funding would be designed as a light management fund or facility, housed in an existing development institution, with fast and efficient access to resources (building on the model of, or perhaps even expanding an existing instrument such as PPIAF of infoDev). Donors could contribute towards individual windows only.

Bibliography

Africa Internet Forum. 1999. *Internet Economic Toolkit for African Policymakers*. World Bank, Washington, DC.

Analysys Ltd. 2000. *The Network Revolution and the Developing World.* Report prepared for *info*Dev. Washington, D.C.

Beardsley, S., I. Beyer von Morgenstern, L. Enriquez and C. Kipping. 2002. "Telecommunications Sector Reform—A Prerequisite for Network Readiness in Kirkman, G., ed., *The Global Information Technology Report*. Oxford: Oxford University Press.

Braga, C. 1997. "Liberalizing Telecommunications and the Role of the World Trade Organization." World Bank Private Sector Division Viewpoint Note Series No. 120. World Bank, Washington, DC.

Chinn, M. and R. Fairlie. 2004. *The Determinants of the Global Digital Divide*. Cambridge, Mass.: National Bureau of Economic Research.

Dasgupta, S., S. Lall and D. Wheeler. 2001. "Policy Reform, Economic Growth, and the Digital Divide: An Econometric Analysis." World Bank Policy Research Working Paper 2567. World Bank, Washington, DC.

Doh, J., H. Teegen and R.Mudambi. 2004. "Balancing Private and State Ownership in Emerging Markets' Telecommunications Infrastructure: Country, Industry and Firm Influences." *Journal of International Business Studies.* 35, 233-250.

Dyamond, A. N. Juntunen, J Navas-Sabater. 2000. *Telecommunications and Information Services for the Poor*. World Bank, Washington, DC. Processed.

Dymond, A. and S. Oestmann. 2003. "Rural Telecommunications Development in a Liberalizing Environment: An Update on Universal Access Funds in World Bank Global ICT Department." *ICT & Development.* Washington, DC: World Bank.

Fay, M. and T. Yepes. 2003. "Investing in Infrastructure: What is Needed from 2000 to 2010?" World Bank Policy Research Working Paper 3102. World Bank, Washington, DC.

Gastanaga V., J. Nugent and B. Pashamova. 1998. "Host Country reforms and FDI Inflows." *World Development* 26: 1299-1314.

Glen, J. and M. Sumlinski. 1997. "Trends in Private Investment in Developing Countries: Statistics for 1970-96." IFC Discussion Paper No. 34. IFC, Washington, DC.

Grace, J., C. Kenny, J. Liu, C. Qiang, T. Reynolds. 2000. "Telecommunications, the Internet and Broad-Based Development." World Bank, Washington, DC. Processed.

Guislain, P. and C. Qiang. 2004. "FDI in Telecommunications." World Bank, Washington, DC. Processed.

ITU (International Telecommunications Union). 1998a. *Rural Telecommunications in Colombia – Lessons Learned.* World Telecommunication Development Conference, Valletta, Malta, 23 March – 1 April, 1998.

ITU. 1999b. *World Telecommunication Development Report.* ITU, Geneva.

———. 1999c. *General Trends in Telecommunication Reform, 1998.* ITU, Geneva.

ITU. 2003d. "Promoting Broadband: Background Paper." ITU Workshop on Promoting Broadband. Geneva, April 9-11, 2003. Document PB/03.

ITU. "Broadband Revolution." Forthcoming.

Izaguirre, A. 2004. "Private Infrastructure: Activity Down by 13 percent in 2003." World Bank Public Policy for the Private Sector 274 September 2004. World Bank. Washington, DC.

Kenny, C. 2000. "Expanding Internet Access to the Rural Poor in Africa." Journal of Information Technology for Development 9 (2000) 25-31.

Kenny, C., B. Lanvin and A. Lewin. 2003. "The Access Divide: 1990 to 2000 in World Bank Global ICT Department." *ICT & Development.* Washington, DC: World Bank.

Keremane, R. and C. Kenny. 2005. "The Costs of Universal Access." World Bank, Washington DC. Processed.

Kinoshita, Y. and A. Mody. 1997. *The Usefulness of Private and Public Information for Foreign Investment Decisions.* Washington, DC: World Bank.

LaPorta and Lopez de Silanes. 1998. "Investor Protection: Origins, Consequences, Reform." NBER Working Paper 7428.

Oxley, J. and B. Yeung. 2001. "E-Commerce Readiness: Institutional Environment and International Competitiveness." *Journal of International Business Studies* 32, 705–723.

Telegeography. 2003. "Global Internet Geography, 2004." Telegeography, Washington, DC.

Pyramid Research. 1999. "Will the Internet Close the Gap?" Report prepared for *info*Dev. Washington, D.C.

Qiang, C. and A. Pitt. 2004. "Contribution of ICT to Growth." World Bank Working Paper. World Bank, Washington, DC.

Rathindran, R. C. Fink, and A. Mattoo. 2002. "An Assessment of Telecommunications Reform in Developing Countries." World Bank Working Paper No. 2909. World Bank, Washington, DC.

Reynolds, Taylor, Charles Kenny and Christine Zhen-wei Qiang. 2004. "Networking for Foreign Direct Investment." *Information Economics and Policy,* 16,2.

Spar, D. 1998. *Attracting High Technology Investment: Intel's Costa Rica Plant*. FIAS (Foreign Investment Advisory Service) Occasional Paper 11 World Bank: Washington, DC.

Titch, S. 2005. "Why Muni Wi-Fi Is a False Hope." *IT&T News*, February 1, 2005.

Ure, J. 2004. “Infrastructure in East Asia and the Pacific – The Way Forward.” Telecom Note For the World Bank. World Bank, Washington, DC. Processed.

Wallsten, S. 1999. “An Empirical Analysis of Competition, Privatization and Regulation in Africa and Latin America.” Stanford Institute for Economic Policy Research, Stanford, Calif.

Wellenuis, B. 1997. “Extending Telecommunications Service to Rural Areas – the Chilean Experience. World Bank Viewpoint Note No. 105. World Bank, Washington, DC.

World Bank. 1996a. *From Plan to Market: World Development Report 1996*. Washington, DC: World Bank.

World Bank. 1998b. *World Development Report 1998/99: Knowledge for Development.* New York: Oxford University Press.

World Bank. 1999c. “A Strategy for Telecommunications Reform in Eastern Europe.” World Bank, Washington, DC. Processed.

World Bank. 2000d. *The Networking Revolution: Opportunities and Challenges.* Washington, DC: World Bank.

World Bank. 2004e. *Private Participation in Infrastructure Database*. Washington, DC: World Bank.

———. 2004f. *World Development Report 2004.* New York: Oxford University Press.

World Bank Global ICT Division. 2004a. “Africa ICT Roadmap and Strategy.” World Bank, Washington, DC.

———. 2004b. “Public and Private Roles in the Provision of Information and Communications Infrastructure Services.” The World Bank, Washington, DC.