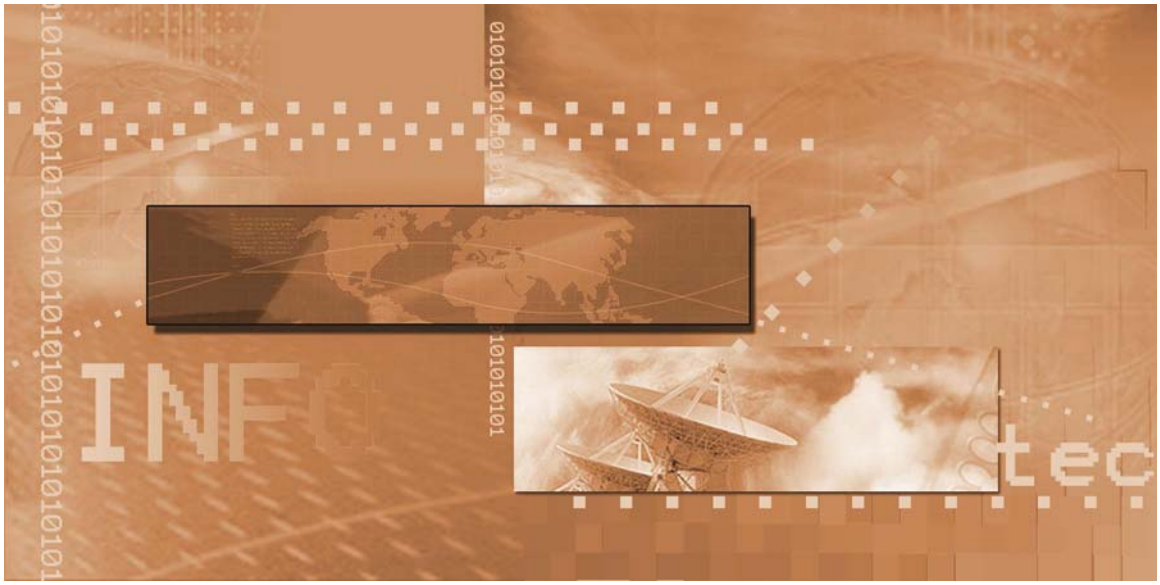
33824

OPERATIONAL GUIDANCE FOR WORLD BANK GROUP STAFF: PUBLIC AND PRIVATE SECTOR ROLES IN THE INFORMATION AND COMMUNICATION INFRASTRUCTURE SECTOR JULY 2004



THIS NOTE WAS WRITTEN BY THE GLOBAL INFORMATION AND COMMUNICATION TECHNOLOGIES DEPARTMENT UNDER THE DIRECTION OF MOHSEN KHALIL, DIRECTOR, BY A TEAM INCLUDING: PIERRE GUISLAIN, STEPHANIE VON FRIEDEBURG, RAVI VISH, JOSEPH SOLAN, MOSTAFA TERRAB, CHARLES KENNY, PETER SMITH, CHRISTINE QIANG, AND RAJESH PRADHAN. THE INPUTS OF PAUL AMOS, JOHN BESANT-JONES, RACHELE GIANFRANCHI, CARLOS GOMEZ, TENZIN NORBHU, CARLO MARIA ROSSOTTO, ANDREA RUIZ-ESPARZA, DAVID SATOLA, AND ELOY VIDAL ARE ALSO ACKNOWLEDGED. THE NOTE DRAWS ON VARIOUS WORLD BANK DOCUMENTS AND OTHER ANALYTICAL PAPERS LISTED IN THE BIBLIOGRAPHY SECTION. THE NOTE IS AVAILABLE ONLINE AT HTTP://INFO.WORLDBANK.ORG/ICT/

ABBREVIATIONS AND ACRONYMS

$	US Dollar, unless otherwise specified
CAS	Country Assistance Strategy
GICT	Global Information Communications Technology Department
IBRD	International Bank for Reconstruction and Development
ICI	Information and communication infrastructure
ICT	Information and communication technologies
IDA	International Development Association
IFC	International Finance Corporation
OECS	Organization of Eastern and Caribbean States
MIGA	Multilateral Investment Guarantee Agency
PRG	Partial Risk Guarantee
PRSP	Poverty Reduction Strategy Papers
WBG	World Bank Group

CONTENTS

LIST OF BOXES

LIST OF TABLES

FOREWORD

Infrastructure services are critical to economic growth, poverty reduction and the achievement of the Bank's Millennium Development Goals (MDGs). The rapid advance of information and communication technologies (ICTs) in particular offers a new and expanded range of options for harnessing the knowledge economy for development and poverty alleviation.

To fully benefit from the utilization of ICTs, developing countries will require private and public financing to develop the information and communications infrastructure (ICI) which is the foundation of ICT applications. Developing countries will also require assistance to create ICI market structures and legal and regulatory frameworks that encourage private participation and the efficient utilization of ICI. The private sector will continue to account for the great majority of capital for ICI network development.

At the same time, the public sector, public-private partnerships and international donor organizations, such as the World Bank Group, will continue to play an important investment role, mainly to support rollout of those parts of the ICI network where international investors are less willing to provide capital alone, such as rural and remote access.

This Note provides guidance to World Bank Group staff on assessing the suitability of available options for public-private roles in the financing and provision ICI, the potential role of the Bank in the various parts of the ICI sector and the main steps which staff should take to analyze these options. It also links to appropriate World Bank Group instruments, relating them to the different public-private models. As we accelerate the implementation of the Infrastructure Action Plan, the Note provides a framework within which staff can design operations in a way that will enable us to maintain the quality of our interventions.

Mohsen Khalil,
Director,
Global ICT Department

EXECUTIVE SUMMARY

Information and communication infrastructure (ICI) plays an important role in income generation, improved delivery of government and social services, empowerment, poverty reduction, fiscal space creation, and economic growth. As such, ICI reform is a critical dimension of development in poor as well as middle-income countries and should be addressed in the context of Country Assistance Strategies (CAS), Poverty Reduction Strategy Papers (PRSP), and other development strategies.

The ICI sector, which includes predominantly telecommunications, but also broadcasting and other information and communication infrastructure, has gone through a profound transformation worldwide over the last two decades. The sector has grown exponentially, prices have dropped, and service quality, coverage, and innovation have improved. Most of the World Bank Group's (WBG) client countries have initiated the transformation process from state-owned telecommunications monopolies to private-sector-led, competitive markets. Benefits of this reform process have been tremendous. Two decades of global experience suggest that private, competitive and well-regulated provision of telecommunications allows for rapid expansion of access to affordable services. But the benefits of reform have not yet been fully realized, as most of our clients are still in the beginning or the middle of the transition. And even in countries that have fully liberalized their telecommunications sector, governments still have an important role to play in regulating and supplementing the market.

A broad global consensus exists in this sector around the need to create such competitive and well-regulated private markets. The challenge lies in managing the transition toward that goal in the most effective way while taking specific country circumstances into account. This challenge is amplified by the acceleration of technological change in the telecommunications sector (and other sectors such as information technology and broadcasting, which are rapidly converging with telecommunications), requiring a flexible and dynamic strategic approach.

The government (typically the ministry in charge of communications) should direct sector policy, in particular related to access goals, but often also with respect to market structure and pace of reform. The sector regulator should implement telecommunications laws designed to correct market failures and ensure competitive provision through licensing. In particular, this requires the pro-competitive allocation of scarce resources (such as spectrum), regulation of operators with significant market power (especially in areas such as interconnection), and implementation of programs to extend affordable access. The responsibility for the design and award of licenses varies by country, with the sector ministry in charge in some cases, the regulator in others and shared responsibilities in a third group.

Turning to investment, financing for the ICI sector—to the extent possible—should continue to come predominantly from the private sector. Well-targeted public

intervention, including financing of telecommunications networks, can also play an important catalytic role in expanding the market through greater private sector participation, as illustrated by the following examples:

- Public investment in the corporatized, state-owned operator may help it prepare for and accompany privatization, including technical assistance, restructuring of the balance sheet, and structural separations and support for redundancy and retraining packages.
- In the exceptional case of conflict and post-conflict environments, public financial support may be needed to provide comfort to hesitant private investors or, even before that, to rebuild essential facilities.
- Telecommunications investments in capacity in excess of their own internal needs by public infrastructure operators (such as railways or power utilities) may increase economic returns on their network investments, and should be carried out in a manner that fosters private, competitive provision.
- Networks to meet the government's own telecommunications needs should usually be designed in the broader context of national network development strategies and may be financed through competitively tendered bids for privately provided communications services.
- Public sector intervention may also take the form of targeted catalytic investments, guarantees, incentives (such as support to private operators through competitively auctioned subsidies), tax measures or regulatory interventions (such as inclusion of universal access in license obligations or asymmetric interconnection) to correct structural imbalances, address unfulfilled demand gaps (including rural connectivity and backbone network development), accompany the transition toward private competitive markets or achieve accelerated development of services, where the private sector would not venture without public support.

Initial costs of regulatory equipment may also be supported by public investment resources, but in the long-term such costs should be recovered from regulatory fees (set at cost recovery levels) on operators.

The WBG will continue to play a significant role in support of ICI network development and the transition to competitive and well-regulated markets. The IFC will remain the primary provider of financing to telecommunications operators, with MIGA providing political risk insurance, while the World Bank (IBRD and IDA) will primarily remain involved in financing technical assistance and adjustment support (including ICI or telecommunications sector adjustment operations) to reform programs that remove policy and regulatory bottlenecks which constrain sector development.

WBG advice and assistance should be flexible, adapting to changes in technology and emerging best practices as well as different market and policy environments in client countries. Its investment support in the ICI sector should:

- follow the same rules that govern loans and advice regarding public expenditures in general (for IDA and IBRD support);
- be provided only in the context of reform efforts that encompass significant sector liberalization and the creation of a capable regulatory body, or have a clear privatization strategy; and
- have a high economic rate of return and a clear catalytic impact, leveraging private resources where the private sector alone would not provide that investment.

INTRODUCTION

Strong, widespread and efficient ICI is the underpinning of any knowledge economy and plays an important role in economic development and poverty reduction. At the same time, in a rapidly changing sector such as telecommunications, technological advances constantly present new opportunities for investment and use. In turn, this suggests the need to re-evaluate the role of governments and the WBG, especially in a global environment that has seen greater private sector skepticism towards investment in at least some subsectors of the ICI market in developing countries.

This note emphasizes the role the ICI sector plays in development. It presents evidence that suggests that a sector characterized by competition and private ownership under a strong, technology-neutral regulatory regime bolstered by pro-competitive access initiatives remains the best way to extend access to telecommunications services that are increasingly important for economic growth. In order to promote such an environment, there may be specific roles for investment in telecommunications by the government. The WBG supports efforts of developing countries to accelerate ICI sector growth, introduce new services, improve performance, and extend services to more people.

This note provides general guidance to WBG staff and clients with respect to the role of the private and public sectors in the ICI sector, which leads to an analysis of how WBG operations may support the development of this important sector. It summarizes and expands upon the main operational implications of the Information and Communication Technologies (ICT) Sector Strategy Paper, approved by the Board of Directors on September 6, 2001, and published in April 2002. The note does not discuss the broader ICT agenda (applications of ICT in the provision of government and private service provision, for example).

The guidelines for government, and so World Bank, support for such investments should be the same for public and World Bank investments 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; and to what extent does it leverage private financing?
- Does the public investment contribute to the removal of bottlenecks and sector constraints and accelerate the transition toward competitive and well-regulated markets?

Potential public investment in information and communication infrastructure that meets these standards may be actively supported by governments and the World Bank.

Furthermore, given the rapid pace of technological change and sector development, best practices are constantly evolving and new policy issues and challenges arise. In such a situation, and especially given a wide variation in market and policy environments in developing countries, best practices should be interpreted with flexibility and sensitivity to country specifics. This guidance note should be read with these caveats in mind and may be updated from time to time to reflect emerging best practices as well as changes induced by technological innovations and market developments.

FORMULATING AND IMPLEMENTING SECTOR REFORM

ICI Networks in Development

ICI networks are made up of telecommunications, broadcast, and postal networks that carry voice and data traffic as well as mail. There is ample empirical evidence to suggest that ICI: (a) is essential to a country's growth, productive capacity, competitiveness, and connection to the global economy; (b) contributes to poverty reduction by increasing productivity, providing new opportunities and empowering poor people; (c) is a vehicle for the efficient delivery of public administration, social and other public services; and (d) is important for transparency and good governance.[1]

While ICIs present opportunities, unequal distribution of information infrastructure may also pose risks. For example, evidence from Botswana and Zimbabwe suggests that areas lacking telephone access see significantly less entrepreneurial activity than those with access. As with the impact across countries, it might be that the cost of being left behind is growing, creating the risk of greater income disparities.

Worldwide, government agencies are the single largest consumers of ICT goods and services. The potential impact of this consumption on the quality of government services can be immense. ICIs are also increasing civil service productivity by dramatically speeding the day-to-day processing of information and regulatory implementation. In Singapore, for example, the government spends approximately $100 million per year on ICIs for the civil service. Studies have found that every dollar spent on this program has generated $2.70 in returns due to expanded productivity and reduced operational costs.

[1] Perhaps the simplest way of demonstrating the importance of ICI networks in the development process is to examine the willingness of the poor to pay for service. The poorest quintile of the population in Chile consider telecommunications such a basic service that they spend more of their income on telecommunications than on water. In fact, the average Chilean spends more of his income on telecommunications than on both electricity *and* water combined. Recent econometric studies also suggest that the quantity or level of telecommunications infrastructure may be connected more generally to investment and growth.

As a result, over 1,500 jobs have been eliminated from the public payrolls and an additional 3,500 jobs have been reoriented towards more productive outputs.

ICI is the underpinning of e-government applications such as those pioneered in Singapore, and there is a strong cross-country correlation between economies with more advanced ICI and those which have advanced further in e-government. Access to broadcast technologies, for instance, has been found to correlate with improved access to government services. ICI reform can have an important role in extending access to those advanced communications services, but also in creating additional tax and license revenues for governments, as well as providing a model for reform in other sectors.

Competition, Regulation, and Private Sector Participation

Because of the centrality of ICI networks to economic development and poverty alleviation, the preeminent goal of sector policy is rapid, sustainable sector growth. Competition and private sector investment are a cornerstone of successful telecommunications sector strategies worldwide, and have fueled the fast growth of telecommunications over the past two decades. Evidence suggests that private, competitive provision under an effective regulatory regime provides better, cheaper service to more people than other regimes.

Competition

Competition is the major tool for seizing the opportunities that new ICI technologies present—opportunities to deliver lower prices and better services to more people across the world.[2] A comparison of Mauritania and Ethiopia illustrates the impact of competition (Box 1). This superior performance has been echoed around the world. 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.

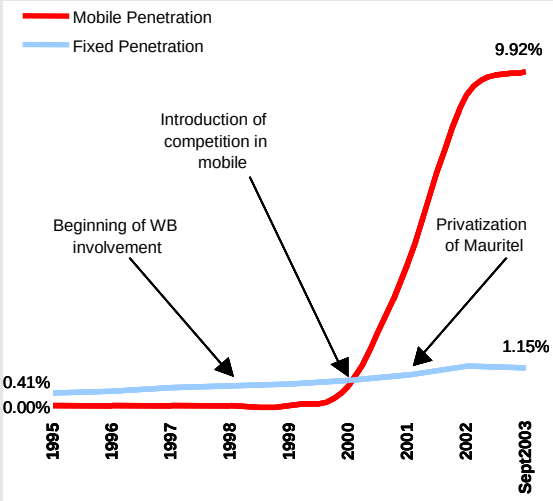
[2] The introduction of private competition over the course of the 1990s in Peru, with the support of the World Bank, is one example of the impact reform can foster. Between 1993 and 2003, the number of towns with telephone service doubled, fixed-lines in the country more than tripled, the number of public phones increased by more than 15 times, the number of mobile phones doubled about every two years, and one out of three poor households in Lima obtained a telephone connection. At the international level, further evidence includes a study of performance in Africa and Latin America over 1984 to 1997, which found that mobile competition was also associated with falling local call costs. Furthermore, East Asia and Sub-Saharan Africa – the regions with the lowest international competition—also see the highest international call costs.

Box 1. The Case for Reform: A Comparison of Mauritania and Ethiopia

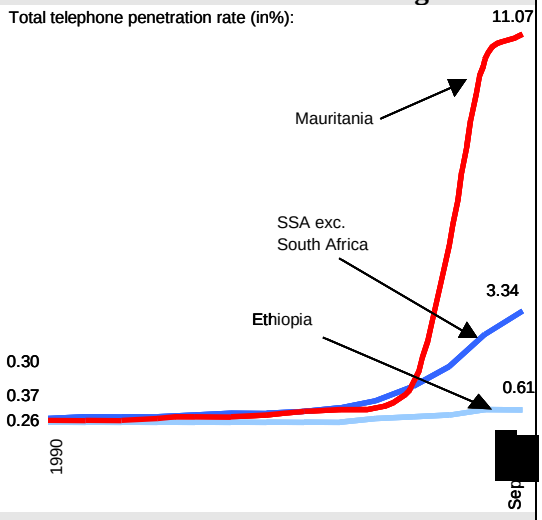
Mauritania embarked on an ambitious reform of its telecommunications sector in 1998. The WBG supported the reform process through financing consultancy services, transaction advisors and capacity-building efforts. These helped to set up a sound legal and regulatory framework, establish a fully operational and effective regulatory agency, open the market to competition, and privatize the incumbent operator. The reform program brought major benefits to users by improving access to services and lowering prices. Overall teledensity jumped from 0.6 percent in 1998 to 11.07 percent in September 2003. A credible and transparent sectoral framework also attracted record levels of private investment and rapid rollout: proceeds from the sale of two mobile licenses totaled $56 million, while the two operators launched services in a record six months. Privatization proceeds from the fixed operator amounted to an additional $48 million (equivalent to $4,065 per line), of which more than $32 million was injected as fresh capital into the company through a capital increase. The macroeconomic impact of the reform goes well beyond these one-off revenues: the continuous development of the sector has led to higher fiscal revenues, the creation of a large number of new jobs, and increased global competitiveness.

Ethiopia on the other hand has not undertaken any substantial reform of its telecommunications sector. Its current policy of maintaining a monopoly in the provision of all telecommunications infrastructure and services has cost the nation in inefficiency and opportunity costs. The government has yet to articulate a sector reform strategy and liberalization timetable. The lack of reform has manifested itself in poor sector growth and performance. In fact, whereas, as noted above, telecommunications penetration in Mauritania increased from 0.41 in 1995, to 11.07 in September 2003, as a result of sector reform (moving the country from the 27th to the 10th rank in Africa, out of 48 countries), in Ethiopia, where sector reform has been lagging, the increase was only from 0.25 to 0.61 over the same period (bringing the country from 39th to 48th rank).

The Rewards of Liberalization



Ethiopia vis-à-vis Mauritania, The Cost of Not Reforming



Source: WBG GICT Department, Africa ICT Roadmap and Strategy.

At the same time, market failures may exist in parts of the ICI sector which weaken the impact of competition. An unregulated dominant operator can stifle competition through charging exorbitant rates or setting onerous conditions as part of network interconnection agreements with other operators. It can also charge prices far above costs to consumers, for example. Furthermore, the market alone may not deliver the socially or economically efficient level of access to rural areas and poor consumers. Such factors are a strong

justification for regulatory institutions and policy makers to intervene to ensure that the market acts to maximize affordable access to a range of telecommunications services.

Regulation

Competitive success is supported by the quality of regulation. Many of the studies cited above suggest that, absent a strong independent regulator, the effects of competition are muted and the impact of privatization can be completely dissipated.[3] 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. 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. 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.

Private Participation

Private participation introduced through new entry dramatically increases investment flows into the sector, including foreign direct investment flows. In addition, privatization of the incumbent (usually fixed-line) telephone company contributes to leveling the playing field for competitors and redirects government efforts towards policy and regulation while increasing the efficiency of a major operator. Privatization also allows the incumbent to take investment, procurement, and staffing decisions independent of political constraints that may limit its ability to compete in the market. For both the incumbent operator and the broader market, then, privatization can play an important role in sustainable development of the company and sector. At the same time, privatization of a monopoly or dominant incumbent into a market which lacks competition (or at least a strong pro-competitive regulator) is likely to have the opposite effect, severely limiting or even reversing the benefits of increased private sector participation.

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, suggesting a new approach may be required (Box 2).

[3] 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.

Box 2: Recent Experiences with Privatization

To take some recent examples, in Latin America, countries such as Ecuador, Honduras, and Paraguay tried to privatize their telecommunications operator, without success, often due to an overly optimistic minimum bid-price. In Africa, the privatization process has stalled or is considerably delayed in half its countries in the process of privatizing telecommunications incumbents, while half of the companies which were partially privatized produced mixed results. A range of other countries (including Egypt and Turkey), have also faced repeated difficulties in trying to privatize their incumbent.

The successful privatization of Mauritel in Mauritania combined the sale of existing equity with a capital increase that favored investment over transaction proceeds. Privatization failures in the sector suggest that selling governments should avoid complicating investments through excessive rollout and coverage requirements, or special conditions on staffing and employment in the privatization process, for example. Failed privatizations have usually involved some combination of restrictive conditions combined with the weak or uncertain financial status of the incumbent.

At the same time, exclusivity periods and other means to stifle competition in favor of the incumbent may have made privatization transactions easier or more profitable in some cases in the past. However, exclusivity has not deterred failure in some recent transactions where purchase conditions were too stringent. Furthermore, the damage done by exclusivity to the consumer and to the economy, as a whole, are far larger than any potential short-term benefit to the incumbent and to privatization revenues. Cross-country studies suggest that privatizing services as a monopoly reduces telecommunications service rollout, as compared with privatizing into a competitive environment. Fiscal benefits of increased competition will normally exceed the possible loss of revenue that may result from the absence of protection or exclusivity granted at privatization within a matter of a few years.

Broadly, a number of lessons are suggested by privatizations of fixed-line service:

(a) As a rule, privatizations should include transfer of management control and immediate competition—exclusivity does not ensure success of fixed-line privatization, but will hinder the development of the sector;
(b) Conditions regarding employment or provision of service to groups other than the poor or excluded should be minimized (experience suggests telecommunications reform increases long-term employment both in the sector and beyond);
(c) As far as is politically and fiscally feasible, minimum prices for bids should be abandoned; and
(d) A clear and predictable legal and regulatory regime (particularly instruments and capacity to regulate dominance) will reduce uncertainty, and so attract bidders.

If, however, privatization appears unviable for country specific reasons (such as a recent crisis or political uncertainty), alternate means of involving the private sector, such as a management contract, may be a second-best solution. While management contracts have been found to create difficulties at privatization (including limited incentives for operators other than the management contractor to bid), they may assist in bringing in technical capacity to strengthen the operational performance and sustainability of the operator. Another option to be evaluated is the unbundling of the operator, separating out elements that may be more attractive to the market (such as backbone/wholesale or shares in mobile operators) for separate, and expedited, sale—although this will inevitably further complicate the sale of remaining assets, especially if not accompanied by policy and regulatory prescriptions that maintain a basic level of attractiveness for each element.

A third option would examine a reverse approach—bundling licenses to use spectrum, for example, with the fixed-line operator to make it more attractive. It should be noted that this approach may limit the economic returns to the bundled resource, and, absent well regulated and carefully designed incentives, may have either a limited impact on the sustainability of the fixed-line operator or allow for cross-subsidies that tip the playing field in favor of the new operator.

Unfinished Agenda

Policy and regulatory issues arise from the growth of Internet and the convergence of telecommunications, computing, and broadcasting. Many countries are in the midst of a second wave of liberalization and sector reform. Issues such as broadband, voice over Internet protocol, new licensing and interconnection regimes, and dispute resolution require innovative approaches, public policies, and finance mechanisms.

Extending Access Beyond the Market

Universal access goals can be reached more efficiently and more rapidly under a competitive regime than under monopoly provision. This is suggested by Chile, the first developing country to provide telecommunications access to over 99 percent of its citizens (Box 3). There remains a potential role for both supply-side and demand-side interventions to extend access beyond the market. Demand-side interventions might include vouchers for low-cost access to ICTs for example. On the supply-side, regulatory approaches that might be examined to extend access include asymmetric interconnection regimes that allow operators serving difficult-to-reach markets to recoup extra costs through interconnection charges or reverse-subsidy auctions, also used with great effect in Chile.

Box 3: Chile's Road to Universal Access

In 1988, under public monopoly provision, fewer than 20 percent of Chilean households had a telephone. Introduction of a fully competitive telecommunications regime greatly increased access in the country, so that by 2000 about 75 percent of households had a telephone. 25 percent of households remained unconnected. The government used an innovative and competitive reverse-auction scheme to allocate subsidies to the operator who would provide services to unconnected communities at the lowest cost. In early rounds, just US$2 million in public subsidy attracted private investment which built 1,000 public telephones in areas previously without service. This ongoing program has raised total access rates to universal levels and is now being expanded with Bank assistance to rural broadband connectivity.

PUBLIC ROLES

Role of the Ministry and Regulator in Overseeing ICI

By far the most important role of government in the telecommunications sector is to ensure competition, and a level playing field for that competition, across market segments. This suggests a policy of liberalization supported by a strong, independent regulatory institution. The government also has a role in setting and helping to meet

access goals in a pro-competitive manner. There may be rare instances where direct investment is appropriate. Government investment in telecommunications is discussed in detail later. Boxes 4 and 5 explain the role of the Ministry overseeing telecommunications and the role of the regulator.

Box 4: The Role of the Ministry Overseeing ICI

The ministry in charge of ICI should draft and update the general sector policy in consultation with the regulator, businesses, the public, and telecommunications operators. After government acceptance of the initial policy, the ministry will draft requisite laws. The policy will largely be implemented by the regulator, under the law, in some cases in conjunction with the ministry (in areas such as universal access and, potentially, licensing). The ministry also has an important role in the coordination of government telecommunications and Internet initiatives. This may involve aggregation of the demand for telecommunications infrastructure by different elements of the public sector, in order to reduce the cost to government, as a whole, for meeting its infrastructure needs. It also involves a monitoring and promotion function to ensure that infrastructure projects undertaken by other sectors are consistent with the telecommunications policy. Finally, it involves inputs into laws and policies formulated by other ministries that may have an impact on the telecommunications sector (trade agreements and investment laws, for example). The ministry will represent the government at a number of international conferences and bodies, including meetings such as the World Summit on Information Society and in some bodies of the International Telecommunications Union. The ministry also has a key role to play in promoting harmonization of telecommunications policies and regulatory frameworks within regional and subregional economic integration arrangements.[4] Harmonization benefits investors as it increases the certainty of the regulatory environment across countries in the same subregion. It can also accelerate reform in slower-moving countries.

During a transition period to private, competitive provision, the ministry frequently provides ownership and governance oversight over the public telecommunications operator. As part of this function it is important that the ministry, in conjunction with the regulator, puts in place mechanisms to ensure policy and regulatory impartiality towards the public operators. Public operators should be licensed in the same manner as private operators and the monitoring of license conditions should be placed under the oversight of the regulator. Further management and operational oversight methods may include a board of independent directors, and/or a management contract between the ministry and publicly-owned operators that ensures rights and obligations. A model followed in some countries is to move ownership functions to another ministry or governmental body—frequently the ministry of finance or a state property body. Together with the regulator and other stakeholders, the ministry in charge of communications should lay out a time bound transition to a fully-competitive telecommunications regime.

[4] Such as the Economic Community of Western African States or the Southern Africa Development Community in Africa, the OECS in the Caribbean.

Box 5: The Role of the ICI Regulator

The regulator should act as the primary instrument for implementing ICI laws. In this regard, the regulator's function will be to foster competitive provision, and to prevent market failure. The regulator develops and implements methods to apportion scarce resources in order to maximize social and economic benefits to the country. Licensing obligations and limits to competition in the cases where there is no natural scarcity should be minimal, and limited to obligations necessary to ensure regulatory control of market abuse or dominance.

There is no single model of regulation that can be applied in all countries. Regulatory design depends in part on the degree of current and possible competition in the market and on political and legal traditions, among other factors. There are, however, some basic and common principles. One of them is the effective separation of operational and regulatory functions: regulators should be independent from the operators they regulate, as codified in the World Trade Organization's reference paper on telecommunications. The Bank also encourages some autonomy of regulators *vis-à-vis* government and policymakers as well as clear accountability and transparency mechanisms. Financial autonomy implies resources that are independent from the vagaries of the budget process, typically through periodic levies on operators. Operational autonomy implies protection from political interference, rules governing conflicts of interest, as well as measures to ensure the regulatory agency is able to attract and retain staff with the requisite expertise.

Regulatory entities typically play a significant role in the areas of licensing, numbering, interconnection and access (ensuring fair competition through regulation of dominance), protection of consumers, monitoring of operators and settlement of disputes, among others. Where markets are not yet competitive, regulators may also have an important tariff or price control function. The regulator frequently has a role in implementing mechanisms to ensure universal service targets laid out in the communications policy are realized in a pro-competitive manner.

ICI regulators are often also entrusted with commercial frequency allocation and management, as well as regulation of broadcast transmission and, in some instances, postal services. This broader scope, as well as the use of technology-neutral regulation, greatly facilitates the synergies between converging information and communications segments and services.

While effective policy and regulation is increasingly vital to the growth of the ICI sector, the pace and nature of technological change requires technology-neutral policies and regulations across ICI.[5] India's newly created communications regulator, with responsibilities across ICT, might be one model for convergent regulation.

Finally, it is likely that in small economies, the level of competition that can be achieved will be lower. This emphasizes the importance of regional cooperation in laws and regulation to allow cross-border operators, such as has begun in the OECS countries of the Caribbean. It also calls for a strong regulatory function to counter abuses of monopoly power.

[5] The danger of technology-specific regulatory 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

Public Sector Investment in ICI

Large amounts of investment will continue to be needed to accelerate and sustain ICI development. The private sector has shown its ability and effectiveness in mobilizing resources and expertise in this area. The Bank, therefore, usually advises against the use of scarce public funds for investment in this sector. Government investment should be limited to cases where there is a clear market failure and regulatory techniques alone are not enough to correct it, and where the investment will significantly accelerate the growth of a competitive sector. At best, investment should occur in a sector that has an established, competitive regime in both fixed and wireless services. At a minimum, public telecommunications investment should both leverage and coincide with an ongoing reform program that will reach best practice within a short, defined time span. Investment in unreformed or nonreforming telecommunications sectors will, in the great majority of circumstances, lead to low or negative economic returns and delays in much needed reforms.

Pre-privatization Investment

Looking at preprivatization investments in the state-owned fixed line operator, such investments have sometimes been justified on the grounds that they improve performance and (so) salability while helping to preserve jobs. Such arguments have gained force after weakening global telecommunications markets have made selling fixed operators more complex.

Nonetheless, such preprivatization investments should be minimized. Private operators are likely to prefer paying a lower price and using savings to decide their own investment program (the delay in investment preserves the new operator's choice value). Investment in an inefficient public monopoly is likely to generate lower economic returns than a private, competitive firm. And investments that artificially support a large workforce are likely to be an expensive and unsustainable method to preserve jobs. It is for reasons such as this that the World Bank has a long standing policy against supporting preprivatization investments across sectors.

Some limited public funding may be warranted to restructure the incumbent along business lines (e.g., by separating basic telecommunications services from other activities and supporting interim management contracts). Support may include, for example: transforming the operator into a corporation governed by company law (corporatization); rebalancing tariffs to phase out cross-subsidies; establishing cost accounting systems; refocusing on core business; restructuring such as creating new subsidiaries; removing barriers to entry and to competition; making equitable arrangements to interconnect new entrants; providing assistance for the transfer of ownership control to the private sector; and ensuring effective regulation of the sector by an empowered regulator. There may also be a role for limited financing of investments likely to generate very high financial and economic returns in the short run which do not hinder the broader reform process

(such as implementing a working billing system in an environment where may services are not charged).

Support to restructure an incumbent's balance sheet as part of the privatization transaction may also be warranted. Here again, however, support should be carefully circumscribed. The goal of such investments should be to ensure a minimal level of viability by addressing outstanding arrears and cross-debts, not to support expansion. They should be predicated on efforts to make privatization as straightforward as possible in an open, competitive environment. As part of a general program of government staffing reductions, there may also be a role for governments to reduce the social impact of restructuring in the telecommunications incumbent.

This cautious assessment regarding the role for preprivatization investments may be mitigated when considering IFC preprivatization investments, however. Through such loans, IFC helps incumbent operators to ready themselves for a privatization or initial public offering, with a clear contractual and time bound exit strategy: if the privatization does not occur within the agreed time frame (leading to a conversion of the IFC loan into shares), the loan becomes callable. In such cases there will frequently be a significant role for concurrent World Bank support for regulatory and policy reform and capacity development to support the privatization process and broader sector development.

Public Financing in Conflict and Post-Conflict Environments

Post-conflict environments may require the rapid construction of basic networks where the private sector may not be willing to enter. Given repeated instances of private sector interest in investment in the telecommunications sector even in the immediate aftermath of conflicts, however (Iraq and Afghanistan have both already attracted vibrant private investment in the mobile sector, for example), public investment in such networks should also be carefully evaluated to ensure that it does not crowd out potential private sector operations.

Furthermore, it should be noted that 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. In such circumstances a license authorization with incentives provided through reverse-auction subsidies is likely to be more suited to long term sector development than a build, operate, transfer model.

If conditions dictate public operation and ownership (due to continued high political risk in post-conflict environments, for example), financial support to public sector entities should be tied to a clear, time bound reform program and sustainable strategy to open the sector to private participation and competition, including specific benchmarks to assess progress in reform. It is likely that private participation in management of the operator will also improve the potential for sustainability of such investments.

ICI Network Investment as Part of Other Infrastructure Operations

The potential to roll out ICI alongside other networks such as cable TV, power, rail, water, pipelines, and roads is a significant one. In the case of energy, there is the added potential to transmit communications signals over power lines. The range of service options and commercial models allows for a variety of private participation schemes, of which those that minimize direct involvement in telecommunications services provision by the nontelecommunications utility are to be preferred. 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 available their rights of way in exchange for communications services.

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).[6]

Increased scrutiny is required of ICI investments in publicly-owned entities outside the ICI sector in order to explore similar scope economies. Single-purpose telecommunications networks, such as the construction of a parallel telecommunications network, merely to serve the needs of the counterpart network provider (telephone lines along power lines purely for the use of the power company, as it might be) will frequently be a wasted opportunity to expand the public network, and the opportunity for expanding reach and private competition in public networked telecommunications services should be actively explored. At the same time, these economies of scope should only be exploited in a manner that furthers private competitive provision of telecommunications services.[7]

In some cases, the transactional costs of such a public-private partnership may be large enough to deter private investment in a project that is justifiable on economic grounds. Funding of public or shared telecommunications infrastructure under such circumstances would need to be made on the basis that: (a) the private sector has been given the opportunity but is not interested in investing in such projects; (b) the case has been convincingly made that the economic benefits of the additional telecommunications investment are high; and (c) the provision of telecommunications services to third parties would be done on a level playing field, without cross-subsidies, tax advantages, preferred

[6] 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.

[7] This suggests that the opportunity to benefit from scope economies should be made on a nondiscriminatory basis to private telecommunications providers who, to the extent practicable, would be responsible for both the investments required to construct the parallel network and operation and maintenance of that network.

procurement or other privileges. The scope of the investment should be as limited as possible (providing duct space, but not fiber, for example). Even in such cases, reverse-auction subsidy mechanisms to attract private investors should be explored as an alternative to direct public investment.

Government Networks

ICI networks are increasingly important to the operation of government and improved governance. Public sector networking requirements may extend beyond the capital to border posts, regional, and local government, for example.

At the same time (and as noted above), single-purpose networks are difficult to justify in financial and economic terms. 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.

Government communications needs are usually best met by the private sector. In some cases, there may not be sufficient demand from the market as a whole to justify network rollout to locations where there is a significant government need for communications. In these cases, the government may wish to stimulate demand through the use of service procurement methods focused on government communications needs (as opposed to particular technologies to meet those needs). In addressing public sector communications requirements in this way, public financing can also foster the development of general purpose backbone and broadband networks.

Broadcasting

There is a role for public investment support of broadcast rollout. As a medium well suited to the needs of poor and illiterate consumers, ensuring widespread access to a range of public service broadcast options may have a significant impact on poverty reduction goals. There are a number of possible avenues for investment support—through the publicly-owned broadcaster, through subsidy schemes to private broadcast providers and/or through grant schemes to community broadcast providers. Regardless of the investment mechanism used, it should further the ends of a pluralistic broadcasting environment providing quality programming that meets the needs of the poor. Public investment in a monopoly or highly concentrated broadcasting sector will dramatically reduce economic and social returns.

<u>Postal</u>

Postal sector reform is in its infancy and most countries still have a public sector enterprise with comprehensive exclusivity rights. Reform of the "sector" is complicated by the fact that it is not one sector, but rather a historical entity (the post office) rendering services of different nature, including the traditional core letter business, logistics, information services, and financial services. Unbundling these services (or the regulation

thereof) and avoiding cross-subsidies is a major challenge. Meanwhile, in most developing (and other) countries, post offices tend to have the widest distribution network of any modern sector entity, creating significant opportunities for new business, including in the area of e-government and more general service provision. At the same time, traditional post offices are bureaucratic, conservative, and poorly equipped to deal with the challenges of innovation and competition. Public sector investment remains the norm in this sector, but should (when financed by the World Bank) be subject to the same tests as investment in the telecommunications sector, namely support of a transition to competition and subsidiarity to private investment and financing.

Access and Rollout Initiatives—Going Beyond the Market

There is a role for governments to support the rollout of productivity and income-enhancing technologies such as ICTs, especially given that the market alone may not be able to meet all socially and economically desirable access and rollout objectives. This includes support for the rollout of ICIs. Services that are deemed necessary for social, development or security reasons, but that are unprofitable even under liberal entry and pricing policies, can be provided and/or rendered viable through limited, targeted subsidies.

The main channel for supporting access schemes is through guarantees and least subsidy schemes awarding licenses for service delivery to the bidder asking for the lowest subsidy. These tenders have proven to be a cost effective way to provide coverage beyond the market. The successful rollout of such schemes would normally require that the market has already been effectively liberalized and that no operators have offered to 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.

Priority in supporting access schemes should go to basic services. Indeed: (a) access to basic telecommunications services, including broadcast technologies, 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.

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 ensure that Bank support is meeting 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.

It should be noted that 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.

Demand-Driven Backbone Networks

A number of governments are rolling out e-development projects that involve the extension of information infrastructure: for example, the provision of Internet access to schools currently not connected to the telephone network. As noted above, single-purpose networks make little economic sense. 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. This will allow for multiple users to access a network in the most efficient manner. In cases where the market is unlikely to provide services alone, competitive tenders (with government financing or comfort, as may be needed) should be considered.

There may also be a role for support in the rollout of privately owned and operated backbone networks through subsidy auction 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). It should be noted that broadband networks will largely be used by wealthier subscribers in poorer developing countries. Support should thus be predicated on high economic returns and the absence of sufficient private sector interest. This may be the case where the comparatively long-term returns to backbone network provision are insufficient to overcome financial market weaknesses, for example. Any such rollout schemes should ensure open, equal access to facilities to preserve a level competitive playing field in the sector.

Telecommunications Regulatory Equipment

There is a public good element to the provision of equipment needed to carry out regulatory functions in the ICI area—not least spectrum monitoring equipment.

Nonetheless, the long term costs should be borne by the sector itself. In some cases there may be a role for start-up costs to be borne by the government, with cost recovery occurring through license and fee payments over time.

ROLE OF THE WORLD BANK GROUP

ICI and the broader ICT sector have a major role to play in development. Combined with the significant impact of reform on access to ICI, and the considerable role that ICT applications already play in World Bank projects in every sector (accounting for as much as 5 to 10 percent of World-Bank funded procurement), this suggests that ICI and the broader ICT sector should have a prominent place in World Bank knowledge, technical, and lending operations. In turn, this suggests that discussion of the sector should be prominent in CAS and PRSPs.

In providing financing and technical assistance in the sector, WBG staff should be cognizant of the unique combinations of policy and market environments that will characterize the sector in different client countries. Given that, there will need to be flexibility in the implementation of best practices in order to tailor approaches to particular countries.

The World Bank (IBRD and IDA) focuses largely on providing support to governments in the development of a pro-competitive policy and regulatory environment for the sector and in extending the boundaries of service provision. The Bank uses a range of instruments (primarily loans/credits, grants, guarantees, learning and analytical work) to: (a) contribute to national ICT strategies and their implementation; (b) support policy reform, including private participation and competition; (c) strengthen the capacity of regulatory institutions; and (d) leverage private investment to extend access to telecommunications services.

This approach, predominantly consisting of technical assistance, generates a significant impact. Evaluation studies looking at countries with Bank telecommunications projects in the 1990s estimate that growth rates in fixed and mobile teledensity increased from 10 percent per year prior to World Bank involvement in the sector to 26 percent after that involvement. This performance suggests economic returns far higher than would be usual for direct investment projects. It is for this reason that the great majority of the Bank's support in the telecommunications sector is, and will remain, technical assistance and policy support.

The Bank provides assistance to client countries in developing and implementing ICI strategies, including establishment of a sound legal and regulatory environment, as well as capacity building. The WBG promotes increased competition and private participation in the telecommunications sector by supporting entry of new service providers, privatization of state enterprises, and more generally by creating conditions that attract direct private investment and facilitate access to domestic and foreign capital markets. The Bank supports the establishment and enforcement of clear, stable, and transparent

regulatory rules and procedures, encourages openness and public consultation, and supports regulatory capacity building through policy advice, training, technical assistance, and other means. This support can be in the form of technical assistance or adjustment lending. In the case of adjustment lending, the main focus of the sector reform program should be sector growth and competition rather than privatization.

The Bank can support the privatization of incumbent operators through advice and assistance in planning and implementing the process as well as the provision of partial risks guarantees (PRG)[8]. Bank support for retrenchment should follow existing guidance regarding the financing of severance pay in public enterprise reform operations. A strong presumption against lending to a public operator should continue to govern WBG activities. In cases where a financial case for support can be made (in terms of investments likely to have a considerable and rapid return), the preferred WBG instrument for such activities is an IFC pre-privatization operation (which will be predicated on the ability to generate a financial return) rather than World Bank resources. The IFC will itself only remain very selectively involved in pre-privatization operations, in cases where the intervention can push a company rapidly into an environment of sustainable private competition.

Where they can be justified, World Bank-backed investments in ICI access should usually be provided only following reform efforts that encompass significant sector liberalization and the creation of a capable regulatory body. By preference, instruments should be close to market conforming (loan over credit over grant, for example). Investments should also overcome a significant development bottleneck, preferably signaled as such in CAS, PSRP, or related documents.

In the exceptional case of conflict and post-conflict environments, public financial support may be needed to provide comfort to hesitant private investors. In the immediate aftermath of conflict there may be a role for World Bank support of a basic network linking major population centers under public operation.

Many World Bank projects in networked infrastructure sectors other than ICI should, from the project concept stage, evaluate the possibility of adding a telecommunications component to the project, and allow for fiber ducting and other physical elements in project design while removing legal and regulatory bottlenecks to their fair utilization. It should be noted again that the resulting infrastructure should form part of a competitive private telecommunications sector rather than an obstacle to the development of such a sector. While World Bank resources should only in the most unique circumstances fund public (i.e., not for the utility's private use) telecommunications investments in a nontelecommunications utility, projects should take advantage of the opportunity to reduce the need for public funding by auctioning rights of way or access to ducting to private telecommunications providers. Few World Bank infrastructure projects (to date) that have involved a telecommunications investment component have followed such a

[8] PRGs can be used to increase the likely success of privatization transactions both in term of attracting bidders as well as increasing their valuation of the privatized companies, and may be combined with MIGA or IFC support.

policy. A recent survey of 12 infrastructure projects with such components over the 1998-2002 period (covering financial systems infrastructure, energy, and transport) found only two which mentioned exploiting scope economies.

Any direct investment support form the World Bank in government-owned networks needs to be carefully designed in the broader context of national network development. Such networks may be financed through competitively tendered bids for privately provided communications services.

There is a place for the World Bank to support the rollout of private ICI capacity to allow governments to better function and to support the private provision of public access that would be unserved by the market acting alone. In those cases, the strong presumption should be in favor of least subsidy tenders,[9] risk guarantee instruments, or procurement of services (to public sector entities). In particular with more advanced technologies and services (Internet, broadband, backbone), the economic justification for Bank involvement will have to be made carefully on a case-by-case basis, involving local stakeholders.

Finally, there may be a role for support in the case of private cross-border backbone networks. Support might be justified on the grounds of bridging the gap between economic returns and financial returns created by transactional rigidities involved in multicountry operations, and/or by the need to overcome low use/low utility traps created by expensive international connectivity. It is likely that such justifications will primarily apply in the case of small countries and within limited areas. Support should be predicated on the presence of reformed markets or commitment to reform including liberalization of the international segment, again to avoid unnecessary use of public investment resources. Support should be bundled, where possible, with MIGA and IFC operations in order to minimize the use of public resources.

Given the dominant role of the private sector in providing investment funds for telecommunications networks, IFC and MIGA continue to have a lead role. IFC and MIGA support should be dependent on activities supporting the development of a private, competitive sector, however. This suggests a strong presumption against investments in companies that benefit from exclusivity clauses or other special treatment from the regulatory and policy environment.

The Global Information and Communication Technologies Department (GICT) is the Global Product Group responsible for all ICT investments on the IFC side and ICI operations on the World Bank side. On the World Bank side, GICT acts as both the anchor and regional sector department responsible for ICI activities. Regarding operations in countries where both the IFC and the World Bank are active, it is imperative that Bank Group personnel follow the approach laid down in the *Staff Guidelines Regarding Conflicts of Interest*.

[9] Output-based aid has been used as a key World Bank instrument for rural access. However, recent projects experienced substantial problems and delays in procurement processing. World Bank procurement guidelines and procedures need to be adapted to support such subsidy schemes under Bank financing.

The Table 1 outlines various Bank Group instruments and their respective role in financing involvement in the sector.

Table 1.

Instrument \ Product Line		Telecom Reform	Regulatory Capacity Building	Investments in Private (competitive) Subsectors	Investments in Government-owned Networks	Investments. Pre-privatization	Extending the Reach of ICTs
Country/region specific	IFC Equity/Loans			√		√	√
	WB Investment				(√)		√
	WB PRG				(√)	(√)	√
	WB PRSC/SAL/SECAL	√					
	WB TA	√	√				
	WB ESW /Non lending TA	√	√				
	MIGA Guarantees			√	√		√
	PPIAF, IFC TF	√	√				

WBG advice and assistance should be flexible, adapting to the rapid pace of technological change as well as different market and policy environments in client countries. Its investment support in the ICI sector should:

- follow the same rules that govern loans and advice regarding public expenditures in general (for IDA/IBRD support);
- be provided only in the context of reform efforts that encompass significant sector liberalization and the creation of a capable regulatory body, or have a clear privatization strategy; and
- have a high economic rate of return and a clear catalytic impact, leveraging private resources where the private sector alone would not provide that investment.

The WBG will continue to play a significant role in support of ICI network development and of the transition to competitive and well-regulated markets.

BIBLIOGRAPHY

Canning, D. (1997a). A Database of World Infrastructure Stocks 1950-1995. Mimeo, Harvard Institute for International Development.

Canning, D. (1997b). Does Infrastructure Cause Economic Growth? International Evidence for Infrastructure Bottlenecks. Mimeo. Harvard Institute for International Development

De Melo, J. (2000). *Telecommunications and the Poor*. Internal World Bank Report. Washington, D.C.: World Bank.

DeFreitas, D., C. Kenny and R. Schware (2001). Caribbean Cooperation: Rise of the Regional Regulator, *info* 3,3.

Duncombe, Richard and Richard Heeks (1999). "Information, ICTs and Small Enterprises: Findings from Botswana", *Development Informatics Working Paper Series*, Paper No. 7, IDPM Institute for Development Policy and Management), June. http://www.man.ac.uk.

Easterly, W. and R. Levine (1997). Africa's Growth Tragedy: Policies and Ethnic Divisions. *Quarterly Journal of Economics* 112 pp. 1203-50.

Easterly, W. and S. Rebelo (1993). Fiscal Policy and Economic Growth: An Empirical Investigation." *Journal of Monetary Economics*, Vol. 32, pp. 417-458.

Eltzroth and Kenny (2003). Broadcasting and Development Options for the World Bank World Bank Working Paper No. 11

Fink, C., A. Mattoo and R. Rathindran (2002). An assessment of Telecommunications Reform in Developing Countries, World Bank Policy Research Working Paper 2909.

Guislain, P. (1997). *The Privatization Challenge: A Strategic, Legal and Institutional Analysis of International Experience*, Washington DC, World Bank.

infoDev (1999). *Internet Economic Toolkit for African Policy Makers*, World Bank.

Kenny, C (2001). Prioritizing Countries for Assistance to Overcome the Digital Divide *Communications and Strategies*, 41.

Kenny, C. and A. Lewin (2003). The World Bank's Record in Telecommunications Lending During the 1900s: An Evaluation Using Cross-Country Data, mimeo, World Bank.

Kenny, C. B. Lanvin and A Lewin (2003). The Digital Divide: 1990 to 2000 and Beyond, mimeo, World Bank.

Kenny, C. and Chr. Qiang (2003). ICT and Broad-Based Development, in *ICT and Development*, GICT Department (ed), World Bank.

Kikeri, S, J. Nellis, M. Shirley (1992). *Privatization: The Lessons of Experience*, World Bank.

Madden, G., and S. Savage (1998). "CEE Telecommunications Investment and Economic Growth." *Information Economics and Policy*, Number 10.

Reynolds, Taylor, Charles Kenny and Christine Zhen-wei Qiang (2004). Networking for Foreign Direct Investment, *Information Economics and Policy*, forthcoming.

Riaz, A. (1997). "Role of Telecommunications in Economic Growth." *Media, Culture and Society*, Volume 19.

Röller and Waverman L. (1995). *Impact of Telecommunications Infrastructure on Economic Growth and Development*, ICCP Draft Working Paper, Paris, OECD.

UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific). 1999. *Economic and Social Survey of Asia and the Pacific, 1999*, Development Research and Policy Analysis Division. http://unescap.org/drpad/pub3/svy5e.htm.

Wallsten, S (1999). An Empirical Analysis of Competition, Privatization and Regulation in Africa and Latin America, World Bank Policy Research Working Paper 2136.

Wallsten, S (2000). Telecom Traffic and Investment in Developing Countries: The Effects of International Settlement Rate Reductions, World Bank Policy Research Working Paper 2401.

Wallsten, S (2002). Does Sequencing Matter? Regulation and Privatization in Telecommunications Reforms, World Bank Policy Research Working Paper 2817.

Wellenius, B. (2001). Chile: Extending Telecommunication to Rural Areas, mimeo, World Bank.

World Bank (2002). *Information and Communication Technologies: A World Bank Group Strategy*, World Bank.

World Bank GICT Department (2003). Competition in International Voice Communications, mimeo, World Bank.

World Bank GICT Department (2004). *Africa ICT Roadmap and Strategy*, mimeo, World Bank.