CHAPTER 5

Lowering Infrastructure, Information, and Finance Barriers

Developing infrastructure is difficult in Africa due to its low population density and high number of small and landlocked countries

SERVICES SUCH AS TELECOMMUNICATIONS, POWER, TRANSportation, water, and sanitation—often called "hard" infrastructure—are vital for economic growth. But the financial sector—part of "soft" infrastructure—is just as important. Africa needs both types of infrastructure to develop competitive agriculture and manufacturing. And to make sure that development is broadly based, it is essential that as many people as possible have access to all these services.

One sector above all offers Africa a chance to leapfrog forward. If Africa can rapidly equip itself with an excellent information and communications technology infrastructure, it will be able to exploit the gains offered by the emerging knowledge-based economy. This opportunity exists now, and it will not come again. If it is missed, information and communications technology will become yet another sector in which Africa trails the rest of the world.

In developing infrastructure, Africa faces problems more severe than any other region. Vast distances and low population density make service provision costly. The division of Sub-Saharan Africa into 48 states, many of them landlocked, makes the barriers worse because small national markets limit scale economies, reduce competition, and increase risk. Poor policies are also to blame. Weak states have taken a large role in these sectors—with disappointing results. State capacity has been overstretched or even undermined, and service provision has been inadequate. In their current state, infrastructure and the financial sector, rather than promoting development, are barriers to it.

This chapter examines these barriers and suggests ways to surmount them. It concludes that new ways of doing business are needed—from a more regional approach to infrastructure development to greater partic-

ipation by the private sector and local communities, with the state concentrating on facilitation and regulation rather than direct provision.

Though Africa requires an estimated $18 billion a year in infrastructure investments, investment is not the whole story. Substantial benefits could be reaped from more effective operations and maintenance of existing facilities, from better regulations and policies, and from greater devolution of functions to the private sector and to lower tiers of government and communities. Such efforts have produced impressive results in several countries. Worldwide experience suggests, however, that development of appropriate regulation should precede privatization or liberalization. Widening access to infrastructure services, especially for rural populations, requires both more resources and innovative approaches. Community and user involvement in infrastructure construction, maintenance, and management—especially in water supply, irrigation, and rural roads—is an important way of improving services in rural areas.

Africa requires investment—as well as better policies, operations, and maintenance

The policy challenge posed by information and communications technology in Africa is to create mass awareness of how it works and what it can do, to foster indigenous capacity and research, and to identify ways to achieve universal access to service. Meeting this challenge requires education. In primary and secondary schools, this can be done through school networking programs. In universities, capacity must be enhanced in applying new technology for research, teaching, and learning. Lifelong learning must be offered through community centers and school and university networks that promote equal access to all.

Funding access to technology remains a major challenge, however. A growing number of African countries—Botswana, Mauritius, South Africa, Uganda—are adopting innovative approaches to fund mass access to information and communications technology, and other African countries could learn from them. Regional cooperation is urgently needed to develop strong system backbones and share resources and knowledge. Broader regional collaboration could also lead to bulk purchasing of capacity, capacity-building initiatives, and innovative financing, helping to achieve economies of scale and to lower costs.

The financial sector also poses policy challenges. In modern finance both the quantity and quality of capital matter greatly. On both counts Africa suffers huge deficits. Liberalization is incomplete, and the thinness of financial markets and gross inefficiencies need to be addressed. There is also an urgent need to expand access by offering financial instruments that serve the economically active poor and by developing closer rela-

tionships between the formal and informal sectors within an integrated financial market.

The most effective way to improve the quality, cost, accessibility, and quantity of capital is to build a market-based financial system. This requires that governments follow sound fiscal policies, that banks and firms be commercialized or privatized, and that governments not stifle markets. In many countries financial sector governance is a higher priority than further liberalization. Improving transparency, contract enforcement, payments systems, and other micro and institutional aspects of the financial system presents the biggest challenge for development. Regulation and supervision are particularly important, especially accounting standards, disclosure requirements, and contract law. As with hard infrastructure, better regulation should precede liberalization.

Regional pooling would diversify risk, promote competition, and generate economies of scale

Banks dominate Africa's financial sectors. Greater emphasis should be given to developing nonbank financial institutions such as stock markets, contractual savings institutions, and leasing companies. In addition, Africa's financial markets are tiny. Regional pooling would diversify risk, promote competition, and generate economies of scale. A cross-border financial system requires improvement in commercial and financial law, contract enforcement, accounting standards, and prudential supervision, and their harmonization across countries.

Catching Up on Infrastructure

Especially when South Africa is excluded, Africa lags behind the rest of the world on almost all dimensions of infrastructure development—quantity, quality, cost, and equality of access (table 5.1). Moreover, over the past 15 years the gap between Africa and the rest of the world has widened.

In 1997 Africa (excluding South Africa) had 171,000 kilometers of paved roads, about 18 percent less than Poland. Africa also contains just 2 percent of the world's telephone mainlines. There are about 10 million telephones in Africa—less than in Brazil—and half are in South Africa. The other 5 million are so dispersed that most Africans live two hours from the nearest telephone. Even when Africa appears to be doing well, other measures highlight inadequate supply. For example, Africa fares better than East or South Asia on length of roads per capita but is at the bottom

when it comes to road density per square kilometer of land area (figure 5.1)—meaning that most people are farther from a road in Africa. In Ethiopia 70 percent of the population has no access to all-weather roads.

War-affected economies in Africa are perhaps the hardest hit by the inadequate provision of infrastructure services. Physical infrastructure stocks—telecommunications, airports, ports, roads, bridges—are often key targets during war. Although some parts of these countries may not be directly affected by war, infrastructure maintenance is neglected during war, and capital spending is cut back in favor of military spending.

War-affected economies are perhaps the hardest hit by the inadequate provision of infrastructure services

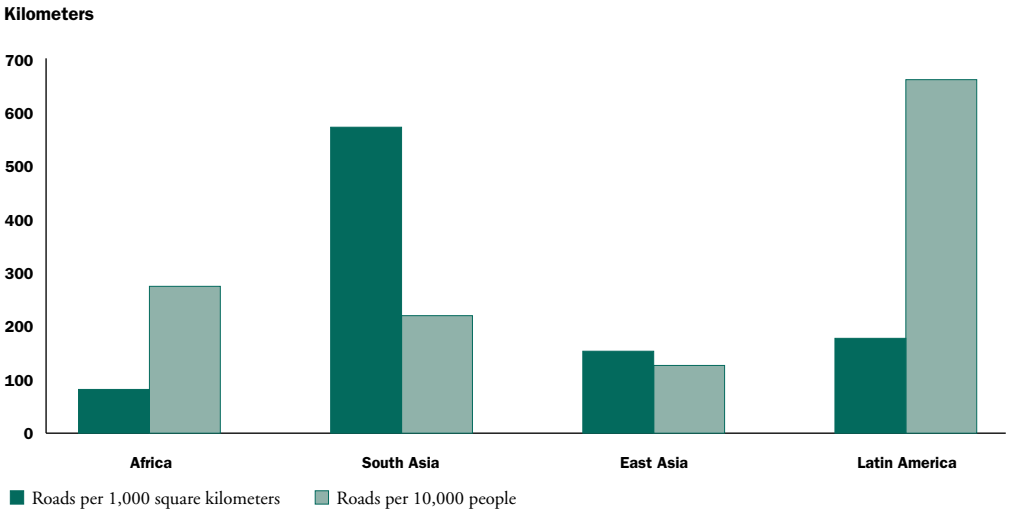
The quality of infrastructure also tends to be worse in Africa. The waiting time for a telephone connection averages 3.5 years. Only 16 percent of roads are paved. More than 80 percent of unpaved roads are only in fair condition, and 85 percent of rural feeder roads are in poor condition, with accessibility limited in most cases to the dry season. In many countries such roads have to carry a large portion of transported goods. These shortcomings are not simply a matter of limited investment. Inadequate maintenance and operating inefficiency have reduced the value of much of the investment that has taken place. One-third of the roads built in Sub-Saharan Africa in the past 20 years have eroded from lack of maintenance. Timely maintenance expenditures of $12 billion would have saved $45 billion in road reconstruction costs over 10 years (World Bank 1994c).

Table 5.1 Infrastructure Indicators by Region

Country group/region	*Electric power consumption per capita (kilowatt-hours), 1996*	*Telephone mainlines per 1,000 people, 1997*	*Paved roads (percentage of total roads), 1997*	*International telecommunications (dollar cost of three-minute call to the United States), 1997*	*Population with access to safe water (percent), 1995*	*Population with access to sanitation (percent), 1995*
Low and middle income	851	60	30	6.22	75	—
East Asia and Pacific	624	50	10	5.60	77	—
Europe and Central Asia	2,788	204	83	4.33	—	—
Latin America and Caribbean	1,347	110	26	4.42	75	68
Middle East and North Africa	1,166	75	50	6.02	—	—
South Asia	313	18	41	—	81	20
Sub-Saharan Africa	439	16	16	8.11	47	47
Sub-Saharan Africa excl. South Africa	146	10	—	—	46	47

Source: World Bank 1999.

Figure 5.1 Road Density and Road Length Per Capita in Africa, Asia, and Latin America, 1997



Source: World Bank 1999.

Costs are also a problem—Africa's transport costs are the highest of any region. The continent is isolated from major maritime and air routes and is served by peripheral, high-cost routes. Freight costs for imports are 70 percent higher in East and West Africa than in developing Asia. For landlocked Africa costs are more than twice as high as in Asia. Air transport costs should be less affected by boundaries and distance from ports, but air transport costs across the continent are two to four times costs over the Atlantic. And in many West African countries air cargo transport is simply not available.

Internal transport costs are also high in Africa. For example, in the mid-1990s road transport costs in Côte d'Ivoire were two to three times those in Southeast Asia (UNCTAD 1999), and charges for moving agricultural produce were two to five times higher in Ghana and Zimbabwe than in a group of Asian economies (Mariki 1999). Higher costs in Africa result from lower road quality, higher fuel taxes, higher imported vehicle costs, and costly bureaucratic procedures. It is estimated that roadblocks and bribes paid to police raise the cost of road transport by one-third in parts of West Africa.

For other infrastructure services the picture is mixed. The cost of telephone calls between African countries can be 50–100 times the cost of calls within North America, but the average rate for a three-minute local

call is lower in Africa ($0.09) than in Europe ($0.11). But averages are misleading. Electricity tariffs, for example, ranged from $0.001 per kilowatt-hour in Burundi and $0.022 in Ghana to $0.31 in Guinea-Bissau in the mid-1990s. (The typical cost in OECD countries is $0.06.) This variation reflects both real cost differences and policy differences. Ghana, for example, is blessed with one of the world's lowest-cost sources of hydropower. In other cases high charges may reflect much higher costs (or monopoly profits), while low charges may not cover costs. Paradoxically, very low electricity prices may be as undesirable as very high prices. If prices are low but costs are not, subsidies will be needed, creating macroeconomic imbalances, or the supplier will have less money to expand supply or improve quality—which may be more important than price for competitiveness or access.

Access to infrastructure services is more unequal in Africa than in any other part of the world

Access to infrastructure services is more unequal in Africa than in any other part of the world. Less than one African in five has access to electricity, and less than half have access to sanitation or safe water. The distribution of services is skewed—urban areas receive more than 80 percent of services, while rural areas, with more than 70 percent of the population, get 20 percent. About two-thirds of rural Africa lacks access to adequate water supplies, and three-quarters is without proper sanitation facilities.

Consequences of Lagging Infrastructure Development

Why does Africa's low infrastructure development matter? Production of all goods and services lags in Africa. Does infrastructure have a significance beyond that of any other type of production? Yes, because the value of infrastructure for growth and development lies in its consumption, not its production. Infrastructure is an input to all other production. This is clear in the case of economic infrastructure such as power and transport. But even social or household infrastructure, such as sanitation facilities, affects people's productivity and so indirectly affects production. Africa pays a high price for its inadequate infrastructure in lost opportunities for growth, for poverty reduction, and for access to services that could improve people's lives.

Low competitiveness. Poor infrastructure is one of the main causes of Africa's low competitiveness. This is not just a matter of inadequate quantity. Cost, quality, and access are all important determinants of competitiveness.

Infrastructure plays an important role in determining the destination and size of private capital flows

Africa's high transport costs are a major burden on competitiveness and growth. Amjadi and Yeats (1995) conclude that transport costs are a higher trade barrier than tariffs in Africa. Limão and Venables (1999) conclude that weak infrastructure accounts for most of Africa's poor trade performance. The volume of trade is very sensitive to transport costs—a 10 percent drop in transport costs increases trade by 25 percent. And transport costs are sensitive to the quality of infrastructure, as measured by such variables as the density of the road network, the paved road network, and the rail network, or the number of telephones per person. Improving a country's worldwide rank in infrastructure quality from the 75th percentile to the 50th (median) increases the volume of trade by 50 percent.

Unreliable service can be even more damaging to competitiveness than high costs. Production stoppages, missed delivery dates, or an inability to communicate reliably preclude the development of higher value-added products that depend on timely delivery. About 25 percent of the decline in Africa's share of world exports can be attributed to weak price competitiveness. The rest is due to nonprice factors, including infrastructure services and the flow of trade information (Oshikoya and others 1999). In newly industrialized countries successful exporters exhibit persistent export growth even in the face of falling world income. They are able to do so partly because they are in close contact with foreign customers, having established "insider" relationships with them. The quality of transactional infrastructure, as represented by the number of telephone lines per capita, is a statistically significant variable in explaining the success of insider countries (Mody and Yilmaz 1994).

Given its inadequate infrastructure and service levels, it is no surprise that Africa is considered a bad business address. This makes it hard for Africa to compete for private capital flows as public flows decline. Infrastructure plays an important role in determining the destination and size of private capital flows. African firms feel strongly about the importance of infrastructure in their business decisions and operations, ranking it high on their list of complaints (WEF and HIID 1998).

Not all African countries are badly placed. But even the better performers may be dragged down by bad neighbors. As much as 1 percentage point of Africa's lackluster growth performance may be due to neighborhood effects (Easterly and Levine 1997). In some cases this is merely reputational—guilt by association. But costly or unreliable infrastructure in neighboring countries can be nearly as important as a country's own (Limão and Venables 1999).

Weak market integration. Inadequate infrastructure also impedes the integration of domestic markets. Though less visible than the barrier to global competitiveness, the barrier to market integration is just as damaging to growth—and even worse for broadly based growth and poverty reduction. The lack of all-weather rural roads, in particular, condemns rural areas to isolation, subsistence production, and high risk.

High transport and other transactions costs, and the possibility of being cut off from markets and supply sources at critical times, limit the attractiveness of specializing in high-value crops (UNCTAD 1999). Though specialization might bring higher average returns in the long run, there would be no long run if there were one catastrophic year in the short run. Better roads and other infrastructure reduce risk and create opportunities for high-value production—including nonagricultural activities, the classic path out of poverty for rural households the world over. Falling transport costs also expand markets for urban production, lower food costs in urban areas, and create opportunities for people and investment to move back and forth between rural and urban areas. Deregulation of transport in Kenya in the 1970s, for example, set in motion a virtuous circle of growth between Nairobi and smallholder agricultural areas for 100 miles around (World Bank 1980).

Inadequate infrastructure is a major barrier to growth and poverty reduction

Slower growth. Many studies have found a link between infrastructure development and growth. The World Bank's *Word Development Report 1994* found that a 1 percent increase in infrastructure stock was associated with a 1 percent increase in GDP. Easterly and Levine (1997) found that inadequate telecommunications infrastructure caused a 1 percentage point drop in Africa's growth rate.

What is harder to see is whether growth causes infrastructure or infrastructure causes growth. But it is generally recognized that the link works both ways. Despite the ambiguity about causality, it seems clear that inadequate infrastructure is a major barrier to growth and poverty reduction, particularly because it lessens competitiveness and impedes market integration.

Poverty and inequality. Some infrastructure services—such as sanitation and safe water—contribute directly to poverty reduction. But the provision of infrastructure services does not automatically reduce poverty. Poorly designed infrastructure could have more costs than benefits for poor people because of inadequate targeting or adverse social, health, financial, and environmental effects (DBSA 1998).

In addition, infrastructure provision can widen the gap between the poor and the nonpoor where access is expensive or where services are not planned to meet the needs of the poor. Delivery can also be disempowering if it turns the poor into passive recipients of services rather than central actors in their own development. There is a presumption, however, that developing rural transport and water infrastructure will especially benefit women, because they bear the biggest transport burden in Africa (box 5.1).

Developing rural transport and water infrastructure will especially benefit women, because they bear the biggest transport burden

Causes of Lagging Infrastructure Development

Africa's infrastructure development has lagged for many reasons, including structural features—geography, poverty, low urbanization, division into small states—inadequate investment, and poor policy.

Difficult geography. Africa is a vast continent with a sparse population mostly living far from the sea. This geography makes transport to and within the region expensive. Bloom and Sachs (1998) identify some spe-

Box 5.1 The Gender Impact of Infrastructure Provision

KENYAN WOMEN WORK AN AVERAGE OF 41 HOURS a week, compared with 26 hours for men. In Cameroon and Guinea-Bissau women's working days are twice as long as men's. In Uganda women produce 80 percent of food and provide 70 percent of agricultural labor.

Similarly, village surveys in Burkina Faso, Uganda, and Zambia have found that African women move, on average, 26 metric ton-kilometers a year (especially water and fuelwood) compared with less than 7 metric ton-kilometers for men. This, combined with women's contribution to agriculture, has led to rough estimates that women contribute about two-thirds of the total transport effort. Given these disparities, time savings in these activities will benefit women most. Improvements in rural infrastructure can also raise the incomes of the poor, particularly women, through several mechanisms:

- *Reducing the time spent collecting water and fuelwood.* The time freed can be used for leisure or for productive purposes such as education or agricultural activities. There is evidence that a significant portion of time saved is used productively.
- *Increasing crop production.* Agricultural output can benefit, particularly where bulky, low-value crops are involved. For example, trucks can be hired to move bulk harvests, fertilizer can be moved to villages and stored in local facilities, and hired farm labor can move more readily to the fields.
- *Improving marketing opportunities.* Isolated rural communities have great difficulty marketing their crops. Crops can be moved in bulk by trucks, but also in smaller quantities by cart or bicycle if adequate roads or paths are available.
- *Expanding access to social services and nonagricultural income-generating activities.* These include health clinics, for which travel time can be reduced, and travel from periurban locations to work in services and construction in the urban informal sector.

Source: ADB 1999 based on Weiss 1998 and Barwell 1996; Hanmer and others 1997.

cific problems: Africa's distance from major markets in Europe and North America, the barrier imposed by the Sahara Desert, Africa's small coastline relative to total area, a shortage of natural ports along the coastline, the fact that only 19 percent of Africans live within 100 kilometers of the coast, the large proportion of landlocked states, and the small number of navigable rivers.

Widespread poverty and low urbanization. Large markets lower infrastructure costs by allowing economies of scale and by broadening competition. But infrastructure costs are also affected by per capita income and urbanization. Many indicators of lagging infrastructure development reflect low demand rather than inadequate supply. If basic household telephone service cost 5 percent of household income, for example, less than 10 percent of Tanzanian households could afford telephone service (Mariki 1999).

Many indicators of lagging infrastructure development reflect low demand rather than inadequate supply

Africa's GNP is only slightly larger than that of Belgium, and it has less than one-fiftieth the per capita income and one-twelfth the population density. Even if Africa were a single market, this would not offset the disadvantages for infrastructure development of low income relative to area. In this respect it is interesting to compare Africa with India. Total and per capita GDP are comparable, but India has two important advantages when it comes to infrastructure development: it is a single country, and its population density is nearly 13 times that of Africa.

Small states. The division of Africa into many small states also affects infrastructure development. Sometimes there are physical incompatibilities between infrastructure systems: rail lines may be of different gauges or may not link up at borders. More generally, border crossings entail high transactions costs. Even if rail systems are compatible, coordination between independent systems entails long delays and high costs that lead to a disproportionate share of bulky items being transported by road rather than rail in East and Southern Africa.

For truck transport, border delays of 10 hours are common, while taxes, licenses, and insurance requirements raise the direct costs of transport. Protection of domestic transport and tour operators further raises costs, impedes the development of cross-border tourist circuits, and greatly reduces competition and service in air transport. Finally, and most important, potential sources of low-cost energy and water resources remain untapped because of the lack of regional cooperation. World-class, low-cost sources of hydropower have not been exploited because of the difficulties, rivalries, and uncertainties attached to producing energy in one country for consumption in another—often with transmission across a third.

More disturbing is the enormous amount of energy wasted through gas flaring, particularly in West Africa. Africa flares gas equivalent to 12 times the energy it uses. Because of the distances involved, not all this energy can be used commercially. But a significant amount could be harnessed, to the benefit of producers and consumers, if the countries with these resources demonstrated a commitment to developing regional solutions to energy shortages.

Institutions, incentives, and policies are the main barriers to the provision of infrastructure

Inadequate investment. UNCTAD (1999) argues that Africa's poor infrastructure performance is mainly explained by a collapse in investment over the past 20 years. Most estimates suggest that Africa requires infrastructure investment of 5–6 percent of GDP a year, with most coming from the public sector. Yet total public investment more than halved in Africa between the early 1970s (12.6 percent of GDP) and the early 1990s (5.6 percent of GDP). Moreover, official development assistance fell in the 1990s, and the share going to infrastructure fell even more.

This decline has not been offset by higher domestic or foreign private investment in infrastructure except in Côte d'Ivoire and South Africa, which have attracted foreign private investment. This investment squeeze contributes to the deterioration in infrastructure, especially in road transport. Insufficient funding for maintenance has also been a binding constraint. In nine East African countries maintenance spending was sufficient for only 20 percent of current networks (Sylte 1996, cited in UNCTAD 1999).

Bad policies. While structural factors and low investment help explain the current state of infrastructure in Africa, institutions, incentives, and policies are the main barriers to its provision. Almost without exception, infrastructure services have been provided exclusively by governments, which own, finance, and manage nearly all infrastructure projects. Public provision typically leads to low efficiency and high costs, with more attention paid to creating jobs than to providing services. High subsidies to insolvent utilities undermine macroeconomic stability and growth. Although data for Africa are scanty, the World Bank recently estimated that energy subsidies for all developing countries total $100 billion a year, equivalent to two-thirds of sector investment requirements.

Governments have often controlled prices with little regard for commercial objectives, including cost recovery. Most prices are far below what is required to operate, maintain, and rehabilitate facilities. In response to the resulting supply shortages, many businesses and households resort to self-provision, often at high cost. In Nigeria as much as half of public elec-

tricity capacity may be inoperable at a given time, mostly because of inadequate maintenance of transmission and distribution networks. As a result more than 90 percent of manufacturing firms have bought their own generators. For firms with 50 or more employees, the extra cost of private power generation was 10 percent of the machinery and equipment budget. For smaller firms the burden was as high as 29 percent (Lee and Anas 1992).

Public policy toward the private sector also impedes infrastructure development. Licensing and other restrictions prevent private firms from competing with state firms and with each other. Restrictions on competition are often defended on the grounds that they conserve scarce capital because utilities are natural monopolies. More often, the effect is to raise the cost and lower the quality of service, thereby restricting growth.

Geography need not be destiny, and much can be done within existing constraints

More generally, administrative barriers and high taxes impede the provision and use of infrastructure by the private sector. The high transactions costs arising from government restrictions deter private sector development and breed corruption, further undermining development. Kickbacks on construction contracts, pilferage in ports, corruption in customs services, and organized extortion of truckers all raise the cost of doing business and reduce competitiveness.

The Way Forward

Geography and other structural factors impose constraints on what can be done to solve Africa's infrastructure problems. But geography need not be destiny, and much can be done within existing constraints. Countries elsewhere have overcome isolation and landlockedness. Moreover, new technology creates new opportunities for Africa—even the potential for leapfrogging stages of development. To move forward, Africa must boost investment, develop private-public partnerships, improve government credibility, increase cross-border and regional cooperation, and widen access.

Boost investment. There is no doubt that Africa's weak and often worsening infrastructure performance is linked to low spending on investment and maintenance. The question is the extent to which low spending is an independent cause or the consequence of other factors—bad policies, lack of regional cooperation, structural features of geography and poverty—that lower the rate of return and, hence, the incentive for investment. In particular, lack of accountability to communities and inadequate commercial orientation may have reduced the incentive to invest in infrastructure.

Africa requires $18 billion a year in infrastructure financing—about 6 percent of GDP (ADB 1999). But increased spending will not be effective, nor will the funds be forthcoming, unless efforts are made to improve policies, management, and regional cooperation. Moreover, difficult choices will have to be made between spending on infrastructure and spending on health and education. And within the infrastructure sector, choices must be made between spending in cities or in rural areas and between spending on new investment or on maintenance.

Spending on rehabilitation and maintenance will probably provide a bigger payoff than spending on new investment

Funding is not always the main obstacle, however:

- Africa has a fairly well-developed stock of ports, rail lines, and long-distance trunk roads to the outside world. But this stock needs to be rehabilitated and used more efficiently. Rehabilitating this infrastructure and filling in the gaps in East and Southern Africa would cost an estimated $400 million (about 0.25 percent of GDP).
- Urban power, water, sanitation, and telecommunications require large investments, even if efficiency is improved. But much of this funding can come from the private sector—indeed, privatization can be a source of revenue for cash-strapped governments.
- Inadequate rural infrastructure is the biggest barrier to market integration and the most difficult to address. It is costly—bringing 90 percent of Ethiopia's population within 20 kilometers of an all-weather road would cost $4 billion, or 75 percent of GDP. Simply catching up on deferred maintenance in Malawi would cost 2.5 percent of GDP.

Rural infrastructure will remain dependent on public funding, including donor-supported spending, for a long time. Nevertheless, new ways of providing small-scale infrastructure by the private sector and increased user and community involvement in projects are also needed to ensure that access increases.

Given the deterioration in infrastructure investment and severe capital constraints, spending on rehabilitation and maintenance will probably provide a bigger payoff than spending on new investment. The key question in such instances, however, is why the infrastructure has not been maintained in the first place. Before rehabilitation investment begins, policies should be examined to ensure that incentives are consistent with maintaining the rehabilitated infrastructure. It is also important to consider whether a facility should be rehabilitated to the same standard as its original construction. Some facilities were built to uneconomic standards,

especially given today's resource-constrained circumstances. Zambia, for example, has decided to downgrade the standard of some trunk roads. At the extreme, economic conditions may have changed so much that an existing facility should not be rehabilitated or maintained.

There may still be instances, however, in which supply-led investment can attract productive investment—as with investment in an export processing zone or in an access road to a high-potential area. Not many generalities apply to all countries, but a few may be appropriate:

- Look first for quick-payoff changes that do not involve investment. Improving border crossings for freight and tourists and eliminating unofficial tolls are obvious examples.
- Develop appropriate regulations before preceding with privatization or liberalization.
- In the case of regional cooperation, bilateral projects may be easier to arrange than grander multilateral programs. Latecomers can often join after a project has been launched.
- If things are moving, the most urgent investment or next step will usually be obvious, driven by demand. If the economy is stagnant and there are no obvious infrastructure bottlenecks, there may be a case for carefully chosen supply-led investments in infrastructure.

One of the best ways to finance investment and increase efficiency is to increase private participation in infrastructure

Develop public-private partnerships. One of the best ways to finance investment and increase efficiency is to increase private participation in infrastructure. Complete reliance on public ownership and provision of infrastructure has created inefficiencies in management and put an undue financial and managerial burden on the state. With the right incentives and regulations, the private sector and other nonstate institutions can deliver services that satisfy the socioeconomic objectives of public goods, often more efficiently than the state.

Private investment in infrastructure varies widely across countries. Among industrial countries the United Kingdom has fully privatized telecommunications, power, and sewerage, while France and Germany retain almost total public ownership in these sectors (table 5.2). In developing countries private participation in infrastructure could reach 40–50 percent (DBSA 1998). Even though Côte d'Ivoire is one of Africa's leaders in attracting private investment, it lags behind many other countries. Private participation in infrastructure offers enormous scope for cutting budget costs (box 5.2).

Table 5.2 Private Investment in Infrastructure in Various Countries, 1995 (percentage of total)

Income group/country	*Telecommunications*	*Power*	*Transport*	*Sewerage*	*Weighted private share*
High income					
France	0	0	10	36	13
Germany	0	67	0	20	9
Japan	35	96	3	0	14
Netherlands	100	23	—	50	46
United Kingdom	100	100	21	100	71
United States	100	81	13	22	47
Middle and low income					
Chile	100	99	7	4	54
Côte d'Ivoire	0	30	0	25	10
Hungary	98	100	53	0	76
Philippines	87	49	25	0	32
Thailand	31	30	20	0	17

Source: DBSA 1998.

Public-private partnerships can take many forms. African countries have used a variety of approaches to attract private participation in railways, airports, and seaports (table 5.3). Introducing competition and private involvement in maritime transport in Côte d'Ivoire generated many benefits for consumers (box 5.3).

Improve government credibility. There are many obstacles to increasing private participation in African infrastructure. The main sources of capital are likely to be foreigners or local European, Asian, or other ethnic minorities, and many governments do not want to cede control to either group. Governments also worry about private investors exercising monopoly power in small markets. Privatization may lead to higher prices for basic services such as electricity and water.

Moreover, foreigners may be reluctant to invest. Political uncertainty is high in Africa, and in traditional utilities the capital costs are high, the expected lifetime of the investment is long, and returns will be in local rather than foreign currency. Thus investment appears quite risky, and if foreign investors are willing to invest at all, they may demand a high risk premium.

To attract foreign investment on acceptable terms, governments need to create a favorable climate for business by providing macroeconomic stability, competitive taxes, freedom to repatriate capital, and all the aspects of governance that affect willingness to invest—including contract enforcement, low corruption, and adherence to transparent rules,

Box 5.2 Harnessing the Potential of Telecommunications

TELECOMMUNICATIONS IS A STRIKING EXAMPLE OF how new ways of doing business could both cut budget costs and improve business services. Malawi, with very poor telecommunications services, illustrates the potential. There are 0.31 telephones per 100 people, compared with 0.5 in Sub-Saharan Africa and 50 in high-income countries. The average wait for a phone line exceeds 10 years. The new, single-provider cellular phone service is expensive ($1,000 to sign on) and has chronic service problems. Many services—data transmission, paging, Internet—are limited or nonexistent. And the monopoly public provider, Malawi Posts and Telecommunications Corporation, cannot afford investments that could improve service.

Telecommunications is the core of the information infrastructure needed for countries to compete in the global economy. With such poor and costly services, Malawi has little chance of attracting foreign (or local) investment for export production. Worse, many other African countries have taken steps to attract foreign investment and technology that will lower their telecommunications costs and enhance their competitive advantage.

Malawi could attract new service providers and private investment that could increase the number of telephone lines sixfold within five years, vastly improve other services, and lower prices—and it could secure almost all of the required $300 million in financing from private sources. Without such a program, including regulatory and other changes, Malawi has little hope of financing the service improvements needed to compete with its neighbors.

Source: World Bank 1997.

including for privatization (Ayogu 1999). At the same time, to protect against exploitation of a monopoly position, governments should develop regulations that conform to international good practice for governance and pricing. An even better way to prevent abuse of monopoly power is to permit free entry and open competition where this is compatible with market size and technology. New technology such as cellular phones and small-scale generating plants offer new scope for competition. In brief, governments need to enhance their credibility and the rule of law to attract private finance and to protect both property rights and the public interest.

The appropriate form of public-private partnership depends on technology and market structure. The key to deciding the structure of ownership—whether a public-private partnership or full privatization—is whether the market can be made contestable, that is, potentially competitive even if only one firm is active. A starting point is the recognition that infrastructure services can often be unbundled into standalone services with distinct market structures.

The electric power sector, for example, can be unbundled into generation, transmission, and distribution. The technology for power gen-

Table 5.3 Selected Forms of Private Participation in Africa's Railways, Airports, and Seaports

Form	*Sector*	*Country*	*Year*
Management contract	Railways	Cameroon	Pre-1996
		Togo	Pre-1996
		Malawi	1993
		Burkina Faso	1997
		Congo, Dem. Rep.	1998
	Airports	Guinea	Pre-1996
		Madagascar	Pre-1996
		Togo	Pre-1996
	Seaports	Cameroon	Pre-1996
		Sierra Leone	Pre-1996
Lease	Railways	Côte d'Ivoire	Pre-1996
		Gabon	1997
		Cameroon	1998
	Airports	Mauritania	Pre-1996
		Côte d'Ivoire	1996
	Seaports	Mozambique	Pre-1996
		Zambia	1998
Concession/build-operate-transfer	Railways	Malawi	1993
		Mozambique	1998
	Airports	Senegal	1996
	Seaports	Mali	Pre-1996
Demonopolization/build-own-operate	Seaports	South Africa	Pre-1996
Divestiture	Airports	South Africa	1997

Source: ADB 1999.

Box 5.3 Private Involvement in Maritime Transport in Côte d'Ivoire

RESTRICTIVE PRACTICES FAVORING THE STATE-OWNED shipping line, SITRAM, resulted in high costs and poor services for Ivorian exporters of major crops and importers of essential goods. These restrictions were first eroded in 1993, when the banana-pineapple exporters association chartered its own vessels at much lower costs, halving freight rates for banana exports to Europe and cutting those for cocoa exports to the United States by one-quarter. Given the increased competitiveness of Ivorian products, the government agreed to liberalize maritime transport in stages.

In 1995 SITRAM was liquidated and a new carrier with majority private Ivorian ownership, COMARCO, was set up. COMARCO and other domestic shipping lines benefited from a reservation of 50 percent of bulk and refrigerated traffic for the three product groups that had been handled by SITRAM (bananas and pineapple, palm oil, wine) until December 1996, when all non-conference traffic was formally liberalized. These measures substantially lowered import prices for consumers and shipping costs for exporters, increasing the competitiveness of Ivorian exports

eration is diverse, ranging from small diesel generators to large hydro installations. Installed capacity can be varied to suit demand. Thus it is possible to rely on the market to deliver an efficient industry configuration—provided the transmission sector is capable of switching between generating plants. If switching capability is limited, competitive discipline is weakened and regulation will be needed to offset this handicap. In principle, however, power generation offers considerable scope for full privatization. Cross-border partnership can extend the range of options outside national boundaries.

Power transmission and distribution networks, on the other hand, are costly and uneconomic to duplicate. Thus territorial exclusivity is warranted. But public-private partnerships are possible through "competition for the market," in which competitors bid for the right to serve a territory—implying continued public ownership but private service provision. In a state with a credible rule of law, contracts can blend decisionmaking and control rights that confer the advantages traditionally associated with ownership.

Well-managed road funds can increase private participation in road maintenance and boost the growth of business

In addition to financing, partnerships can involve institutional innovation. One promising institutional innovation has been road funds to improve road maintenance. Learning from mistakes made in earlier attempts, second-generation road funds are being used to contract out maintenance and are funded by user charges, normally a fuel levy plus vehicle licensing fees. The funds are overseen by public-private boards with broad representation, including road users, with an independent chairman and subject to external audit. Boards recommend charges to the legislature. Evidence suggests that users are willing to pay charges if these go toward efficient road maintenance. Well-managed road funds can increase private participation in road maintenance and boost the growth of business.

In Ghana the revenue mobilized for road maintenance doubled in real terms between 1995 and 1997, and the share of roads rated as good or fair rose from 41 to 80 percent between 1995 and 1998. Road funds have also been successful in Zambia. They work best when users can see that the charges they pay are spent on maintenance, and when governance mechanisms ensure that stakeholders have an adequate voice in management. There is a danger, however, that road funds will reduce fiscal flexibility. Thus they should be viewed as a provisional solution for underfunding of road maintenance, to eventually be replaced by reintegration into a reformed and well-functioning bud-

get process or by a commercially operated road agency (Gwilliam and Shalizi 1999).

Increase cross-border and regional cooperation. Regional cooperation could also improve the infrastructure linking African states with each other and with the rest of the world. There are two approaches to regional cooperation: a program approach and a project approach. A recent example of the program approach is the Transport Protocol for Southern African, a promising effort to harmonize transport policies and procedures in the region. Another is a resolution from a November 1999 conference of air transport ministers in Yamoussoukro (Côte d'Ivoire) under which 23 states agreed to liberalize air transport in West and Central Africa within two years. The Yaounde Treaty of 1961 assigns to one company (Air Afrique) the traffic rights of 11 West and Central African countries and allows national carriers to service only local markets. Schedules are inconvenient, do not reflect market demand, and are changed for political reasons. Air safety and security are deficient. Prices are high and services limited—Burkinabe fruit and vegetable producers could sell more than 10 tons of produce a week to Gabon but are offered only 3 tons of capacity. And transport and handling charges total as much as 71 percent of costs for products sold on the Rungis market in Paris. It is hoped that liberalization will increase competition, lower air transport costs, modernize safety equipment and navigation systems, and promote tourism and trade.

Regional cooperation could improve the infrastructure linking African states with each other and with the rest of the world

An example of the project approach is the initiative to develop the Maputo Corridor between Mozambique and South Africa, with the full support of the Southern Africa Development Community. This effort combines cross-border cooperation with private participation to rehabilitate and upgrade transport infrastructure—including roads, rail lines, ports, and harbors—and promote broad economic development. The project also aims to streamline border crossings and involves large industrial investments, including a $1.4 billion aluminum smelter and a $2 billion steel plant using Mozambican gas. The project is an example of infrastructure leading rather than following growth, the rationale being that the uncertainties for such a cross-border project would simply be too great without the public sector taking a lead and, in this case, involving international organizations as well.

Regional cooperation could significantly cut the cost of power and water in some countries. By exchanging electricity with its neighbors, South Africa could save $80 million a year in operating costs. And with

coordinated construction rather than national plans, it could save $700 million in expansion costs over the next 20 years (Sparrow and Masters 1999). Such cooperation requires institutions or agreements that build trust—users have to abandon costly policies of self-sufficiency, and producers have to risk heavy investment for export production. International organizations and other outside agencies may be able to facilitate such agreements by providing finance or, just as important, by acting as mediators or guarantors of projects.

A successful example of this approach is the Lesotho Highlands Water Project, in which South Africa guaranteed repayment of a World Bank loan used to build a dam in Lesotho that provides water to South Africa. Another promising approach is the Southern Africa Power Pool, an association of national power companies that meets regularly to coordinate power system planning, including regional production. Though no new large regional project has been launched, the power pool is laying the groundwork. West Africa would benefit from a similar mechanism to export the natural gas now being flared (see above). Investment in a pipeline would be needed, but the potential return is high.

Widening access to infrastructure services, especially for rural residents, requires more resources and more innovative approaches

Widen access. Widening access to infrastructure services, especially for rural residents, requires more resources and more innovative approaches. Paradoxically, efforts to ensure equal access for rural and urban areas have often proven counterproductive. Rural residents are generally willing to pay considerably more than the actual costs for services such as electricity and clean water. Yet attempts to provide services below cost, along with political pressures not to collect fees, have limited funds for maintenance and expansion—creating a vicious circle of poor maintenance and low payments.

One promising way around this is being tried in Mozambique. Electricity can be produced from small diesel generators for about $0.18 a kilowatt-hour, excluding capital costs. This is more than twice the average price of electricity in urban areas, but still well below the $0.25–0.35 a kilowatt-hour that rural users are willing to pay for high-value uses of electricity. The government has set up utility companies using diesel generators that have then been sold to private investors below cost (a capital subsidy) for continued commercial operation. Innovative schemes such as this could greatly expand access to infrastructure services at modest public expense while providing incentives for efficient operations and maintenance—while also providing opportunities for small business to both provide and use the services.

To be effective, local participation should incorporate all users of infrastructure services

Community and user involvement in infrastructure construction, maintenance, and management is the most effective way to improve and expand infrastructure services in rural areas. Infrastructure projects with user participation are generally more successful than those without—especially for rural roads and water supply, where an inability to exploit economies of scale and lower technical efficiency make implementation difficult. For example, water systems in Kenya built as part of self-help efforts proved far more reliable than those installed by the water ministry, which were hampered by lack of funds, poor organization, and failure to design according to community needs.

Many governments, usually in association with nongovernmental organizations or donors, have set up social funds to provide supplementary resources for small community projects. There are many variants, but most such schemes allow communities to choose projects (for example, road, water system, or school) and require a substantial community contribution to construction, maintenance, or both. Such participation increases efficiency, strengthens community ownership of projects, ensures transparency and accountability in project planning and implementation, and empowers the users or beneficiaries of the project. To be effective, local participation should incorporate all users of infrastructure services to ensure that the project meets local requirements, uses local materials and technology, and is provided and maintained at lower costs.

Faced with undersupplied and poorly maintained infrastructure services, many African governments have taken steps to devolve responsibility for management, especially in sectors with direct local benefits (water supply, irrigation, rural roads). In water supply, governments are devolving management and maintenance to water associations, which ensure that decisions on supply are consistent with the local environment and the requirements of farmers.

Decentralized planning and local participation requires that communities be granted greater autonomy and be held accountable, and that there be functioning channels of coordination. Greater autonomy can come by making central funds available to implement local priorities in education, health, welfare, and poverty reduction. Local implementing agencies should also be given some financial independence in charging and collecting fees for services. Greater autonomy should be complemented by a system of accountability that enables local governments and community groups monitor the implementation of projects.

Exploiting Information and Communications Technology

In the emerging knowledge-based economy of the 21st century, information and communications technology will likely assume an importance that dwarfs other types of infrastructure. This shift offers Africa a chance to leapfrog intermediate stages of development by avoiding costly investments in time, resources, and the generation and use of knowledge. Africa has a chance to benefit not only as a consumer in the new knowledge economy, but also as a producer. It cannot afford to miss this opportunity.

Politics and institutions are the biggest hindrance to the development of Africa's information and communications technology

Politics and institutions, not technology or economics, are the biggest hindrance to the development of Africa's information and communications technology. Africa's leaders must have a better understanding of the benefits of information and communications technology in order to foster the political, legal, and institutional conditions under which it will flourish. This involves developing the knowledge to apply the technology to local settings, improving relevant infrastructure, promoting equitable access, and creating enabling environments for the development and flow of the necessary content and knowledge. Above all, African governments must promote a competitive telecommunications industry and educate their people in information and communications technology.

Where Do Things Stand?

Broadcast infrastructure. Broadcast technology, mainly radio, is the dominant mass medium in Africa. In 1996 Africa had more than 104 million radios, or 19.8 per 100 people, compared with 3.6 televisions and 0.3 personal computers per 100 people (Okigbo 1999). More than three in five Africans can be reached by radio transmitter networks, while television coverage is largely confined to major towns. Most information resources are widely shared—one copy of a newspaper may be read by more than 10 people, and there are usually three users per Internet dialup account. It is not uncommon to find most of a small village crowded around the only television, which is often powered by a car battery or small generator.

Broadcast technology will continue to dominate the region. Thus African countries must integrate traditional broadcast technology with new Internet tools in a way that meets social, economic, and political

needs. Africa requires both high-tech solutions such as satellites and low-tech solutions such as wind-up radios and low-cost community telecenters where poor people can make telephone calls and receive faxes or email.

Although telecommunications infrastructure is spreading, few Africans can afford their own telephone

Telecommunications infrastructure. Telecommunications is a core component of the economy, a primary form of infrastructure, and the basis for the development of the information society (Adam 1998). The International Telecommunication Union estimates that in 1998 global sales of telecommunications equipment and services exceeded $1 trillion—five to six times Africa's GNP. Africa has the world's least developed information and communications infrastructure, with just 2 percent of the world's telephones and fewer than 2 telephones per 100 inhabitants. On average there is one telephone line for every 200 people—and in Mali, Niger, and Zaire there is one line for every 1,000 people (Jensen 1999).

Some African countries, however, have made telecommunications a priority and are installing digital switches with fiber-optic intercity backbones and the newest cellular and mobile technology. For example, some of the world's most sophisticated national networks are in Botswana and Rwanda, where 100 percent of the mainlines are digital.

Mobile cellular telephony has grown rapidly in Africa, from reaching just 6 countries in the early 1990s to 42 countries serving more than 250,000 customers (excluding 2 million in South Africa). Although cellular phones are expensive, they are the only viable alternative to long waits for a standard phone—and more than 1 million Africans are on waiting lists for a phone. Operators provide access mainly in capital cities but also in some secondary towns and along major trunk routes.

The use of fiber-optic cable for international traffic is still in its infancy in Africa, and most international connections are carried by satellite. Although it is improving, Africa's terrestrial network is still analog in some countries and prone to faults caused by changing weather and poor maintenance. But the low base of the infrastructure is a blessing for the installation of digital circuits. In 1996 the portion of digital lines in Africa was 69 percent—close to the world average of 79 percent. Overall, however, the region averaged 116 faults a year per 100 lines, compared with a world average of 22 and a high-income country level of 7.

Although telecommunications infrastructure is spreading, few Africans can afford their own telephone. In 1996 the average business connection cost $112 to install, $6 a month to rent, and $0.11 for a three-minute local call. But installation charges were above $200 in some coun-

tries (Benin, Mauritania, Nigeria, Togo), line rentals ranged from $0.80 to $20 a month, and call charges varied from $0.60 an hour to more than $5 an hour. The cost of renting a connection averaged almost 20 percent of 1995 GDP per capita, compared with a world average of 9 percent and an average for high-income countries of just 1 percent.

There is a strong correlation between the liberalization of telecommunications, increased access, and lower costs. In Africa liberalization has promoted a bottom-up approach in the form of short-term, low-risk investment in cellular services, trunk radio technology, very small aperture terminals (VSATs), and other value added services (such as the Internet).

Improving information and communications infrastructure will require better training and equipment

The need for universal service and increasingly complex technical standards, interconnectivity arrangements, and traffic and frequency management and monitoring have created pressure for better telecommunications regulation. For example, the proliferation of broadcast and communication applications has made radio spectrum scarce in Africa. New policies are required to develop national information systems and harmonize national and international frequency plans (Struzak 1997).

Many African governments have created regulatory bodies, drafted legislation, and sought technical assistance for telecommunications. But getting down to business has often been difficult. Some countries have established regulatory bodies simply to meet World Trade Organization or World Bank requirements. These bodies vary considerably in terms of scope, design, function, staffing, and separation from the parent ministry. Improving information and communications infrastructure, especially in deploying the Internet in rural areas, will require better training and equipment of these entities.

Internet infrastructure. Internet growth has been phenomenal in Africa, with the number of countries with access jumping from 4 in 1995 to 50 in 1999 (including North Africa). Similarly, Internet hosts grew from 316 in 1995 to 10,703 in January 1999. Although these numbers are impressive, access is unequal both between and within countries. Access is largely confined to capital cities, though a growing number of countries have providers in some secondary towns.

There is also a rapidly growing interest in kiosks, cybercafes, and other sites for public Internet access (schools, police stations, clinics) that can share the cost of equipment and access among many users. Many phone shops are adding Internet access to their services—even in remote towns where reaching the nearest dialup access point requires a long-distance

call. In addition, a growing number of hotels and business centers are providing Internet access.

The cost of Internet access is a substantial barrier to its growth in the region. Charges vary between $10 and $100 a month. The average monthly cost of using a local dialup account for five hours is $60 (including usage fees and telephone time, but not telephone line rental). Twenty hours of Internet access costs $29 a month or less in the United States. Although European costs are higher than U.S. levels, most are far lower than African charges for comparable use. Moreover, industrial countries have per capita incomes at least 20 times the African average.

The greatest challenge for Africa's Internet connectivity is not access but content

Competition could cut Africa's costs dramatically. Most African capitals now have more than one Internet service provider, and there are more than 400 public providers across the region. Yet 20 countries have just one provider, most of which are run by public telephone operators. Other challenges include low-bandwidth access to international gateways, inadequate cooperation among local providers, poor strategies for managing domain names and Internet protocol (IP) addresses, insufficient regional cooperation, and the lack of a regional Internet backbone.

Still, the greatest challenge for Africa's Internet connectivity is not access but content. A recent survey found that Africa generates just 0.4 percent of global content. And when South Africa is excluded, Africa generates a paltry 0.02 percent. It is difficult to categorize content on Africa into meaningful subject areas. But a large portion can be broadly classified as business information—about institutional activities, products and services, and news. There is a dearth of scientific and technological information on Africa, from Africa.

Applications for Social and Economic Development

Despite the limitations, many Africans have embraced information and communications technology. Electronic mail, for example, has been adopted by almost every agency with international communication needs. Similarly, the Internet has become a cheap and effective means of exchanging information on and marketing African businesses, including for selling distinctive products abroad.

More than 6,000 correspondence course students all over Africa can now use email and the World Wide Web to obtain advice and reading

materials from their tutors at the University of South Africa. The university offers its tens of thousands of students in South Africa electronic registration, downloading of study materials, and posting of exam results. Farmers are also starting to realize the benefits of information and communications technology. They have begun to search for the latest market quotations to negotiate better local prices for their crops, and many are exploring new avenues for international trade. A Kenyan farming cooperative has established a relationship with the U.S.-based Earth Marketplace to sell local produce directly to North American consumers, bypassing distributors. Independent newspapers and magazines in more than 40 African countries are now published on the Web, allowing remote users to obtain the latest news and analysis without waiting days or weeks for postal deliveries.

Though some projects show promise, the potential for dramatically boosting Africa's access to education and knowledge has barely been tapped

The potential of information and communications technology for social and economic development is demonstrated by school networks in the Eastern Cape in South Africa and by a regional network for exchanging information on malaria outbreaks operating from South Africa's University of Durban. To date these initiatives have been carried out as experiments, without sufficient human resources and tools. But access to information could stimulate change and create learning environments more meaningful and responsive to the localized and specific needs of learners. Teachers and learners could obtain material using new technology, transforming education and enabling people to develop new skills. The African Virtual University now brings top-quality scientific training and online reference materials to 13 countries in Africa. But the potential for dramatically boosting Africa's access to education and knowledge has barely been tapped.

Unlike earlier broadcast media, interactive information and communications technology can empower people. Such technology could, for example, play a decisive role in developing human capacity for food security in Africa, by providing people with the knowledge and skills they need to put agricultural science and production inputs to best use.

Information and communications technology could also improve health care. Many of the problems in Africa's health sector stem from a lack of information. Information and communications technology could provide health workers with rapid information exchange, conferencing, and distance learning, as well as immediate access to advice and diagnostic assistance (chapter 4). In Mozambique, for example, the Faculty of Medicine in Maputo is developing a local teleconsultation service that transfers images to doctors in other hospitals.

Better information and communications technology can also improve people's access to government, increasing participation in government decisionmaking and improving public services. New technology also offers benefits to government. Through a comprehensive database, South Africa's government can now reconcile housing applicants across regions, spotting double applications and reducing fraudulent housing claims. And government Websites are increasingly promoting tourism and culture to attract foreign investment and strengthen trade links.

Rapid changes in technology require constant awareness not only of new developments but also of what has been done in other countries

The Way Forward

Though information and communications technology offers enormous benefits for Africa, developing it will not be easy. What steps should Africa take?

Disseminate information on what is possible. Underdeveloped information and communications technology is often attributed to a lack of understanding of what is possible. Rapid changes in this technology require constant awareness not only of new developments but also of what has been done in other countries.

Many African countries have already developed a wealth of best practices that could be shared. Several countries have substantially privatized telecommunications. Mozambique has developed a national information and communications infrastructure. South Africa has established an agency for universal service and conducted a study of electronic commerce. Mauritius has set up an informatics park. And Senegal, South Africa, and Uganda have created community information and communications centers. All these efforts offer lessons for other countries. Thus there is a need to:

- Develop awareness-raising programs to improve government and public understanding of information technology applications as they are being used elsewhere.
- Establish "centers of specialization" that train policymakers and government and private users, and provide opportunities for advanced training at existing regional centers of excellence.
- Offer training that uses distance learning technology to introduce users and policymakers to the creative use of existing infrastructure.

Create an enabling environment. Although there is no universal model for liberalizing information and communications services, governments

should favor competition, not monopoly, and promote private rather than public investment. In addition, policymakers should assess the demand for new technology and set clear objectives. The need for a better quality of life and equality of access makes universal service a mandatory objective.

A growing number of countries—Mauritius, South Africa, Uganda—have created universal service funds to which telecommunications operators contribute a small percentage of their revenues (0.16 percent in South Africa). The funds are then used to finance rural infrastructure development. Other countries use the license fees from telecommunications operators to finance rural telecommunications projects. In Botswana the government ensures that rural villages have access to telecommunications services by contracting the operator to build the necessary infrastructure.

Africa will have trouble participating in the global information economy unless it increases the generation and flow of knowledge

Many policy issues could be tackled by developing clear and coordinated policies and guidelines through broad national participation, international consultation, and within regional and subregional discussions of national information and communications infrastructure plans. Such plans are in place in more than half of African countries. By themselves, however, these national strategies are no panacea. Increased government commitment and action, improved capacity of regulators to evaluate new technologies and projects, and innovative applications are just as essential. Policies should not only improve the governance of information and communications technology, but also use information and communications technology to improve governance.

Foster indigenous capacity and research. Africa will have trouble participating in the global information economy unless it increases the generation and flow of knowledge. Beyond building basic skills such as reading, writing, communications, and teamwork, Africa requires trained people—especially young people who can use technology, choose technology, and develop local applications. Making the next generation literate in information and communications technology will require progress in education, especially in integrating technology into primary and secondary schools through networking programs. It will require enhancing the capacity of African universities to apply new technology for research, teaching, and learning. And it will require creating opportunities for lifelong learning through community centers and school and university networks that promote equal access for all.

Regional and international collaboration is key for achieving the economies of scale needed to lower costs and attract private investment in information and communications technology…

Enhance national, regional, and international cooperation and partnerships. Given Africa's small markets, regional and international collaboration is key for achieving the economies of scale needed to lower costs and attract sufficient private investment. Countries must collaborate to develop strong system backbones and to share resources and knowledge on information and communications infrastructure. Regional and national collaboration that leads to the bulk purchasing of capacity, capacity-building initiatives, and innovative financing arrangements—public offerings, build-operate-transfer agreements, joint ventures, bond sales to users—could also help achieve economies of scale and lower costs.

Some efforts have already been made. The Regional African Satellite Communications initiative, which plans to launch Africa-based satellite systems, has provided incentives for regional cooperation. In 1998 communications ministers from more than 15 African countries agreed to support an information and communications infrastructure known as the Africa Connection, and development efforts are under way by the Southern Africa Development Community, the Common Market for Eastern and Southern Africa, and the Economic Community of West African States. Kenya, Tanzania, and Uganda (together known as the East African Community) have launched a multimillion-dollar telecommunications backbone project to improve access to advanced and reliable communications. Regional cooperation could also help resolve common issues such as Internet governance and encourage the creation of economic communities.

Developing a Robust Financial Sector

A WELL-FUNCTIONING FINANCIAL SYSTEM IS ESSENTIAL FOR DEVELopment. It should be able to mobilize foreign and domestic resources and channel them to high-return investments, intermediate between savers and investors to reduce and allocate risk, and provide broad access to financial services, including for people on the margins of the economy. In so doing, finance facilitates competition, market integration, broadly based growth, and poverty reduction.

The quantity, quality, cost, and accessibility of finance are as important to development as those of more traditional forms of infrastructure. In addition, the financial sector performs a crucial function that

has no direct parallel with physical infrastructure—it provides a channel for macroeconomic policy, as an instrument for stabilization and growth.

How effective is the financial sector in promoting African development? Despite numerous reforms, not very. South Africa has one of the deepest, most sophisticated financial sectors outside OECD countries, and a few other African countries—Kenya, Mauritius, Zimbabwe—have relatively developed systems. But most of the region's financial systems are weak. Limited savings are mobilized from domestic or foreign sources. Credit to the private sector is modest and often costly. Financial sectors are dominated by banks providing a small range of services.

…just as a regional approach to financial sector development will be needed to increase competition, cut costs, and lower risks

Harnessing finance for development will be a long process in Africa. Progress will require financial sector development as well as financial reform. Indeed, most African countries have introduced market-based reforms, but post-liberalization problems need to be addressed. Increased access to financial services is essential, and will require making borrowers more creditworthy (rather than lowering standards for formal sector credit), developing nonbank financial institutions (leasing companies, mutual funds, insurance companies), and strengthening links between formal and informal financial systems. These efforts will improve quality and access to services and increase competition. Financial sector governance—regulation and supervision, transparency, contract enforcement—will also require sustained attention. Given the small size and limited diversity of many African economies, a regional approach to financial sector development will be needed to increase competition, cut costs, and lower risks.

Financial Sector Reforms and Their Legacies

After independence most African governments intervened heavily in the financial sector, nationalizing private banks, creating new state banks and nonbank financial institutions, setting interest rates for savings and lending, restricting the allocation of credit, and limiting external capital transactions. These policies were intended to increase savings and direct them to areas of high economic and social priority. The methods used were broadly in line with the development thinking of the time, and in many cases were supported (or at least not opposed) by international financial institutions and bilateral donors.

By the late 1980s, however, it became widely apparent that this approach was not working. Repressed financial systems failed to mobilize

capital or steer investment to areas of growth, and the solvency and capacity of financial institutions were undermined. Controls encouraged politically motivated loans and corruption and diverted funds from intended purposes. Nonperforming loans increased alarmingly in many African countries, and a lack of sound savings alternatives contributed to capital flight.

While many countries now have stronger financial systems, reforms have often been less successful than expected

Financial sector reforms introduced in the 1990s tried to correct these problems. While the scope and pace of reforms differed across countries, they were based on two pillars: liberalization and balance sheet restructuring. Most reforms liberalized interest rates and removed ceilings and other controls on credit allocation. Though the details varied, the outcomes were similar (Soyibo 1997). Thus even though Ghana lifted restrictions on lending much faster than did Tanzania, interest rates followed the same pattern (Nissanke and Aryeetey 1998).

Weak standards for capital adequacy, lending, and accounting had led to excessive concentrations of risk, unrecognized loan losses, and inflated profit reports (Popiel 1994). Thus balance sheet restructuring and recapitalization of state banks were often among the first steps of reform. But as disillusionment with the results set in, efforts were directed toward increasing private participation in banks. Privatization of financial institutions usually began with governments seeking strategic buyers to assume majority ownership of large commercial banks. This approach was only partly successful: some publicly owned banks were divested, but in many cases the state remains dominant.

Other institutional reforms have been introduced in recent years. Licenses have increasingly been granted to new private banks—including foreign banks—and nonbank financial institutions, and efforts have been made to improve regulation and supervision. Stock markets have opened up in several countries. And an increasing range of nongovernmental organizations and other agents have entered the semiformal or microfinance sectors. But while many countries now have stronger financial systems, reforms have often been less successful than expected.

Costlier credit and wider spreads. Reform programs anticipated an initial increase in the spread between lending and deposit rates. But, more than a decade after reforms were started, the spread continues to widen in many countries, sometimes to high levels (table 5.4). And since liberalization, many financial systems have seen high real interest rates.

Little financial deepening. Liberalization was expected to encourage financial deepening, with a positive effect on savings mobilization and credit

allocation. But for the most part ratios of money and credit to GDP have not increased since reforms. On both indicators, most African countries continue to lag behind their Asian comparators. In many countries banks have reduced commercial lending (including in rural areas) in favor of holding government securities.

Continued distress and limited competition. Governments are still reluctant to close distressed state banks. At the same time, small, undercapitalized institutions have mushroomed since liberalization. Many of these new institutions are not only weak, they have also failed to trigger competition in the banking sector. As a result market segmentation has emerged between foreign and domestic banks, solvent large private and public banks, and small private banks.

Governments are still reluctant to close distressed state banks

Limited development of money markets and capital markets. In some cases access to cheap credit through central bank discount facilities has made interbank borrowing and lending less attractive. In other cases issues of large quantities of high-yielding bills to meet fiscal requirements

Table 5.4 Inflation, Interest Rate Spreads, and Real Interest Rates in Africa and Asia, 1980–97 (percent)

	Inflation			*Interest rate spread (lending rate minus deposit rate)*			*Real interest rate,*
Country	*1980*	*1990*	*1997*	*1980*	*1990*	*1997*	*1997*
Benin	—	—	3.5	8.3	9.0	—	—
Botswana	13.6	11.4	8.6	3.5	1.8	4.8	5.0
Cameroon	9.6	1.1	1.5	5.5	11.0	17.0	18.8
Côte d'Ivoire	14.7	–0.8	4.0	8.3	9.0	—	—
Ethiopia	4.5	5.2	–3.7	—	3.6	3.5	7.1
Ghana	50.1	37.3	27.9	7.5	—	—	—
Kenya	13.9	15.6	12.0	4.8	5.1	13.5	12.8
Malawi	—	11.8	9.1	8.8	8.9	18.0	13.0
Mozambique	—	47.0	5.5	—	—	—	—
Nigeria	10.0	7.4	8.2	3.2	5.5	13.1	8.9
Senegal	8.7	0.3	1.8	8.3	9.0	—	—
South Africa	13.9	14.4	8.6	4.0	2.1	4.6	11.2
Tanzania	30.2	35.8	16.1	7.5	—	21.4	8.3
Uganda	—	33.1	6.9	4.0	7.4	9.5	16.8
Zambia	—	107.0	24.8	2.5	9.5	12.2	16.5
Zimbabwe	5.4	17.4	18.7	14.0	2.9	13.9	14.2
Bangladesh	—	6.1	5.2	3.1	4.0	5.9	12.9
India	11.4	9.0	7.2	—	—	—	7.8
Malaysia	6.7	2.6	2.7	1.5	1.3	1.8	6.0
Philippines	18.2	13.2	5.9	1.8	4.6	6.1	9.7

Source: World Bank 1999.

have deterred other capital market issues. Though Africa has about a dozen stock markets, several of which opened in the 1990s, their mere existence is inconsequential for economic growth and investment if there are few opportunities for sharing risk, trading shares, and providing liquidity. Except in South Africa, the region's stock markets are by far the smallest of any region, both in the number of listed companies and in market capitalization. They are also highly illiquid, which seriously constrains their ability to contribute to economic growth (Senbet 1997).

Financial reforms have built on weak institutions and have often been poorly sequenced

Why Have Reforms Been Disappointing?

A number of explanations have been offered for the lackluster results of financial reforms.

Incorrect sequencing. Financial reform has often preceded macroeconomic stabilization. In particular, interest rates were often liberalized before fiscal deficits were brought under control. When that happens, higher interest rates can increase government debt, crowd out private credit, and contribute to further macroeconomic imbalances—as well as reduce incentives for banks to seek out new clients. Domestic public debt has reached high levels in a number of countries, including Cape Verde, Ghana, Kenya, and Zimbabwe. In Nigeria unstable political and economic conditions led to the collapse of the financial system, necessitating policy reversals that undermined credibility (Soyibo 1996).

Incomplete reforms. Continued poor financial performance has reflected a lack of progress on some reforms (World Bank 1994a). Financial systems have still been used to finance public activities. Restructuring balance sheets and recapitalizing banks were not sufficient to change behavior; that would only happen if banks were no longer publicly owned and pressured to lend to loss-making public enterprises.

Weak institutions. To be fully effective, financial liberalization requires a number of prerequisites (World Bank 1994b). In addition to a stable macroeconomy and adequate regulation and supervision, there must be reasonably sophisticated and solvent banking institutions operating in contestable financial markets. Few African countries satisfied these conditions prior to liberalization and deregulation, limiting the possibility of rapid gains.

A focus on national systems. Except in the West African monetary zones, reforms have focused on small national systems. These offer little scope

for competition, economies of scale, or diversification of risk, particularly given the dependence of most African countries on a few primary products with variable prices.

Macroeconomic risks. Macroeconomic risks reflect poor coordination between fiscal and monetary policy. If tight monetary policy is maintained in the face of loose fiscal policy, interest rates will likely rise to unhealthy levels, and banks will retreat from developing new business in favor of holding public debt. Inconsistent policies (including overvalued exchange rates) and external shocks also contribute to uncertainty, again raising interest rates. High perceived macroeconomic risks can be inferred from the short-term maturities at which most African governments borrow. In some African countries these risks have been estimated to raise government borrowing costs by 6 percentage points.

Market risks. Market risks arise from capital market inefficiencies such as a lack of liquidity or severe interest rate volatility. For example, lack of a secondary market for treasury bills restricts liquidity and raises risks and the costs of borrowing. Poor liquidity management by governments is estimated to have added 0.5–3.0 percentage points to short-term borrowing costs in many African countries.

Microeconomic risks. Microeconomic risks are also affected by government policy, but tend to have a greater impact on capital costs for the private sector. The accuracy and reliability of financial information, including company accounts, affect the cost of capital, particularly in equity markets. A legal system that does not enforce financial contracts in a timely manner will reduce the supply of capital, increase its cost, and limit access to finance. A payments system that does not permit rapid and reliable transfer of funds for settlement of financial contracts will increase the cost of capital. A system for title transfer that is untimely or insecure will increase the cost of capital raised through debt securities by reducing transactional liquidity in the secondary market or by causing a risk premium to be built into secondary market rates.

To these risks should be added the risk entailed in lack of diversification in small markets, along with the higher costs of supervision and other overhead that raise the cost of capital. Lowering the cost of capital is not a simple matter of stabilization or a few macroeconomic or financial policy reforms. Rather, financial reform and development is a long process involving the development of trust and policy credibility, complex institutions, and complicated governance procedures within a framework of economic and financial integration (Wilton 1999).

Financial reform and development is a long process involving the development of trust and policy credibility, complex institutions, and complicated governance procedures

The Way Forward

Commercial microfinance institutions that serve the economically active poor are an encouraging recent development

Africa's financial systems face many challenges. The financial side of macroeconomic policy still requires strengthening—including by setting appropriate fiscal deficits, taking into account the arrangements for their financing. To a large extent, well-working financial markets are the result of sound government policy and its day to day operations. Money market development, for example, depends on such mundane factors as whether treasury bills are issued daily or weekly, and how these funding operations are coordinated with the central bank. Some priorities for financial sector development can be summarized in light of the preceding discussion.

Improve access to financial services. Increasing access to basic financial services—particularly savings facilities—is a major issue in Africa, where most people do not have access to the formal financial sector. As noted, the number of bankable clients should be increased by using innovative approaches rather than by lowering prudential standards and so increasing financial instability. One encouraging recent development has been the expansion of commercial microfinance institutions that serve the economically active poor (Robinson forthcoming). Leading examples include Bolivia's BancoSol and Bank Rakyat Indonesia.

The Kenya Rural Enterprise Programme, which is modeled on BancoSol, is Africa's best-known example. Commercial microfinance institutions typically offer savings and credit services on commercial terms to economically active households and enterprises that are too small to be served by large commercial banks. Well-structured commercial microfinance institutions have managed to sustain high loan recovery rates, cover costs, and make profits. Their lending rates are higher than those of commercial banks but lower than those of informal moneylenders, who are the main alternatives for their customers.

The growing financing needs of small borrowers can also be met by developing closer links between the formal and informal financial sectors. Such links can enable banks to lower the costs of information as well as develop innovative, community-based contract enforcement mechanisms. In Ghana, for example, there is potential for linking informal savings collectors (*susu*) to commercial banks in a way that increases the portion of susu savers with access to susu credit (Aryeetey and Steel 1995). Such links, where formal institutions mobilize deposits and allocate credit through informal and microfinance agents, could be encouraged by fiscal policies and regulation and supervision systems.

To share risk, informal and semiformal financial agents must be credible. Because it is difficult to regulate and supervise such agents, they should be given incentives for increasing formalization through stronger links with the formal sector. A possible approach is to develop rural banking based on cooperative arrangements that allow banks to regulate informal and semiformal lenders (Aryeetey 1997).

Strengthen financial sector governance. In many countries improving contract enforcement, transparency, payments systems, and other micro and institutional aspects of the financial system is a higher priority than further liberalization. While regulation and supervision have improved in some countries, further improvements will require, among other things, paying competitive salaries for skills that are in high demand in the private sector and outside Africa.

Accounting standards, disclosure requirements, and contract law will require sustained attention to ensure the integrity and credibility of financial institutions

There is also a long way to go in ensuring that regulators are truly independent. External links may enhance independence and offer economies of scale. For example, regional supervisory agencies might be more credible than national ones. But accounting standards, disclosure requirements, and contract law will all require sustained attention to ensure the integrity and credibility of financial institutions. The issues involved in creating proper incentives for financial sector development go beyond financial institutions to much broader issues of governance, such as judicial independence. Without a political commitment to good governance, financial sector development will be difficult whatever the level of technical expertise in the sector.

Develop nonbank financial institutions. As noted, Africa's financial sectors are dominated by commercial banks. More emphasis needs to be placed on developing nonbank financial institutions, including those offering contractual savings and leasing services, as well as equity and debt markets. These can promote competition in different segments of the market. Africa's young and growing population suggests potential for contractual savings institutions such as pension funds and insurance companies, but in many countries this area of finance is underdeveloped and provides few attractive options to potential clients. Capital markets improve risk management, offer opportunities for price discovery, bolster corporate governance, and create possibilities for privatization and can be stimulated by it (Aryeetey and Senbet 1999; box 5.4). While a portfolio in any one African country might be risky, rates of return for groups of countries are far less volatile.

Pursue a regional approach to financial sector development. As noted, most African financial sectors are small, and most economies depend on a

few primary products. A few large firms may represent a disproportionate share of the bankable demand for credit, and a few major banks may saturate the market, reducing the potential for competition and lowering incentives to develop new clients. In many countries, even well-intentioned efforts to strengthen national institutions will have a hard time overcoming these obstacles.

Africa's young and growing population suggests potential for contractual savings institutions such as pension funds and insurance companies

A regional approach offers many advantages. It enables institutions to operate over a wider area and diversify risk, and it offers potential for greater competition and economies of scale—especially important for spreading the high fixed costs of institutions such as stock markets and bank supervision agencies. But in the presence of capital controls and without a common currency, there are limits to what can be done regionally. And even with free movement of capital and a common currency, financial development will not occur unless other policies are in place. In the CFA zone during the 1980s, for example, banking systems were used to avoid the fiscal rigor required by the monetary union, leading to the buildup of arrears by public enterprises and subsequent financial distress. But a number of cross-border activities can be developed on a regional basis, including banking, bank supervision, and stock markets.

The basic building blocks for cross-border banking are improving and harmonizing commercial and financial law, contract enforcement, accounting standards, and prudential supervision. A number of regional organizations—the Southern Africa Development Community, the Central Bank of West African States, the Macroeconomic and Financial Management Institute of Eastern and Southern Africa—are working at the political and technical levels to improve and harmonize regional stan-

Box 5.4 Privatization Based on Capital Markets

CAPITAL MARKETS HAVE BEEN AN IMPORTANT VEHICLE for privatization in countries such as Chile and have, in turn, been stimulated by new issues stemming from divestiture. In Africa transactions such as the privatization of Kenya Airways and of major utilities also have potential for stimulating capital market development, deepening markets by increasing the supply of major listed companies. This is particularly welcome given the thinness of Africa's stock markets.

Capital market–based privatization also offers less obvious benefits. These markets can provide a monitoring mechanism to curtail inefficiencies resulting from mismanagement. They increase the likelihood that enterprises will be fairly priced and so can help depoliticize privatization. And privatization through local capital markets allows for local investor participation, diversifying ownership of the economy's resources and contributing to the credibility of privatization.

dards. Well-capitalized regional and international financial institutions are increasingly recognized as a means of providing a base of institutions with the ability to diversify risks within their aggregate balance sheet, and it is notable that Africa already has the highest penetration by foreign banks of any region.

Foreign banks have provided stability, know-how, and a range of services to African financial systems. But the marginal returns to further foreign entry may be lower than elsewhere. And if finance is confined to small countries, foreign entry will not solve the problem of banking concentration. In the next phase of financial sector development, greater gains may come from improving incentives and transparency in local markets and aligning policies and regulation to facilitate regional banking.

Pooling resources for regional capital market development would enhance the potential for mobilizing local and international finance

More broadly, pooling resources for regional capital market development would enhance the potential for mobilizing local and international finance for regional companies, while injecting more liquidity into the markets (Senbet 1998). Among the potential vehicles for financial integration are regional securities and exchange commissions, regional self-regulating organizations, regional committees to harmonize legal and regulatory systems, and coordinated monetary arrangements. Tax treatment of investments must be reviewed with a view to harmonization, because tax policy is an important incentive or disincentive for both issuers and investors. Clearance, settlement, and depository systems, along with regulation and accounting standards, should conform to international standards.

This discussion of regionalization is not taking place in a vacuum. Initiatives have already developed mechanisms for regional capital markets, anchored around the Abidjan (Côte d'Ivoire) Stock Exchange. There are also proposals in Southern Africa for developing stronger links between the Johannesburg (South Africa) exchange and the smaller exchanges of Botswana, Namibia, Swaziland, and Zimbabwe (Aryeetey and Senbet 1999). These efforts at regional capital market integration are positive examples for the rest of the region.