

# ICT4D, Regulation and Strategy

ALISON GILLWALD

*University of Cape Town, South Africa*

## Background to Regulation

The central policy principle in telecommunications policy and regulation, from a development perspective, has always been universal service. From the first dial-up phone for voice service to broadband internet that can offer interactive data services, universal access remains the central policy challenge. The following sections assess policy reform outcomes in terms of this key policy objective, highlighting the very different development of these services in developing regions of the world dependent primarily on mobile access, compared to Europe and North America. It also tracks the new and common governance and regulation challenges facing governments all over the world as they seek to align the human, commercial, and political rights of citizens in a digital world.

In most parts of the world, the instrument for delivering on this universal mandate was initially through a public utility model. Network infrastructures were regarded as “natural monopolies” in that the services they provided could not be economically duplicated owing to the high fixed costs of network construction. The economics of infrastructure industries dictated that the best way to bring affordable services to citizens was through exploiting the economies of scale and scope made possible by monopoly provision. While in many countries in the global North this logic delivered over a century of near-universal basic voice service, in most of the global South by the 1980s, when global reform of the telecommunications sector got underway, fixed line penetration levels were well below 5%, with a few exceptions.

By the last quarter of the twentieth century, with new, cost-effective technologies making

possible the economic duplication of certain infrastructure components and services, and a growing acknowledgment of the inefficiency of telecommunication monopolies, the rationale for monopolies was increasingly eroded and difficult to enforce. The wireless revolution of the early 1990s made feasible not only the duplication of access networks but also their rapid deployment. Further, it trumped the fixed line service by offering mobility. For seamless communication by customers on different networks, rival firms need to cooperate in order to deliver services. Where operators are unequal, they are unlikely to do this voluntarily or fairly without an independent enabler or arbitrator in the case of disputes (see Melody, 2000).

This first wave of reform happened in the context of the pre-eminence of the World Trade Organization amongst multilateral agencies in the 1980s and 1990s, and conclusion of the agreement on the General Agreement on Tariffs and Trade (GATT) for services. For the telecommunications sector, it manifested itself in the first global agreement on telecommunications services and introduced an internationally negotiated reform agenda. Specifically, it dealt with regulatory intervention required to create competitive markets – tariff regulation, interconnection, scarce resource utilization (names and numbers), with a caveat on universal service regulation. This trajectory of an increasingly deregulated environment informed the conventional wisdom that emerged around telecommunications by the 1990s as part of the broader Washington Consensus, or neoliberal agenda, on economic reform and provided the logic for the upsurge of reform across the globe over the last two decades (See O’Siochru, Girard, & Mahan, 2002).

## Phase 1 Reform: Overcoming the Digital Divide

The first reform agenda had essentially four components: establishment of an independent

*The International Encyclopedia of Digital Communication and Society*, First Edition.

Edited by Robin Mansell and Peng Hwa Ang.

© 2015 John Wiley & Sons, Inc. Published 2015 by John Wiley & Sons, Inc.

DOI: 10.1002/9781118290743.wbiedcs132

regulator, privatization of the incumbent, universal service strategy, often including a dedicated agency and/or a dedicated fund, and liberalization of markets.

### *Regulation*

Bergman et al. (2000) offer a model of the linear progression of regulation in relation to the maturity of competition in the market. They identify the changing aspects of regulation in relation to the market structure adjustments made as markets open up. In the first phase of liberalization, when monopolies tend to have exclusive rights, the focus is on restructuring the state owned entities and delivery on their mandate. In the second phase, with competition in upstream and downstream components of the industry, the dominance of incumbents is likely to continue to be a major area of focus for regulators, especially the remaining monopoly components in the infrastructure to which competitors need to gain access.

Once the industry structure has been substantially transformed and competition more fully established, anticompetitive behavior and bottlenecks will persist but the market and regulatory framework is expected to resemble other competitive sectors of the economy more closely than before. Under these conditions, what the market delivers should be compatible increasingly with distributive aims, and regulation is therefore likely to be largely ex post with some ex ante control regarding mergers and state aid (Bergman et al., 2000, pp. 127–129). This view of a linear progression of regulation has been criticized by many (see for instance Mansell, 2005; Melody, 2005) and while segments of the market may be fully competitive, no infrastructure based market is sufficiently competitive not to be regulated at all.

Although the focus of the first phase of reform was primarily on market restructuring and ownership, particularly privatization, it also represented a fundamental shift in the primary mode of regulation. As Majone (1994) points out, for more than a century public ownership was the principal form of economic regulation in Europe (and its colonies). Although the intention was to regulate strategic sectors in the public interest, experience demonstrated that “public ownership and public control cannot be assumed

to be identical” (1994, p. 79). He links the shift to an alternative mode of control, in which the ownership and risk of infrastructure are placed in private hands but their conduct is subject to rules, enforced by specialized agencies – directly to the failure of control of monopolies through public ownership (Gillwald, 2009).

Ineffectual regulation of partially privatized incumbents and partially liberalized markets, together with poorly implemented universal service strategies, are some of the primary reasons for the lag in voice, and now broadband, penetration and the relatively high cost of services in many developing countries. With private property and competitive markets classically being understood as the necessary conditions for a vital market economy, two fundamental principles can be shown to have driven the telecommunications reform process: privatization of public assets and liberalization of the market through the introduction of competition (Stiglitz, 1998). As traditional public utilities and departments of posts and telecommunications gave way to markets, “deregulation” was erroneously assumed to mean the end of public control. In what Majone describes as the “apparent paradox” of deregulation, however, in order to deal with the complexity and dynamism of these new multi-player markets, regulation has increased over the last few decades.

### *Privatization*

Claims that markets have failed to deliver the associated benefits of reform often cannot be sustained in the case of telecommunications in many developing countries. In very few countries was the reform model ever comprehensively implemented in the first phase of reform up to the turn of the century. Telecommunications reform programs initiated across the African continent, for example in the late 1990s, often focused on optimizing revenues for their treasuries through privatizations or high mobile license fees, rather than on a restructuring of markets and establishment of regulatory arrangements to ensure the benefits of competition and associated consumer welfare gains.

Conditions conducive to attracting the long-term investments required for infrastructure

development, such as policy stability and regulatory independence, were seldom created. Privatization and exclusivity agreements generally inhibited competition, focusing instead on maximizing returns on investments that were often repatriated at the end of the exclusivity period, as was the case in South Africa, for example. As a result, few countries saw the benefits of market reform. Reform tended to focus on setting up universal service agencies and funds, generally targeting fixed line network extension or user subsidies. Initially ignored in early basic voice service strategies and regarded as a service for the elite, the liberalized mobile market was, in fact, where the massive pent-up demand for communications was being met.

It is not that privatization is inherently flawed. Indeed, for many developing countries, privatization was arguably the only way to finance network extension with often highly indebted incumbents. To be successful, however, the incumbent operators and those that oversee the privatization process require significant institutional capacity. Privatization produces enormous asymmetries of information that require significant capabilities on the part of government to manage effectively, as do issues of ownership and control, rights and responsibilities: “Thus while privatisation involves a reduction in the scope of state functions, it requires a functioning market and a high degree of state capacity to implement” (Fukuyama, 2005, pp. 24–25).

After privatization, the demand for these specialized skills extends to the dedicated agencies responsible for the oversight of privatized entities, if they are to fulfill their mandates and contribution toward national objectives. It is not only a matter of individual capabilities, though this is important. The uncritical adoption of institutions and institutional designs, no matter how close to “best practice” they may appear to be, arguably will have negative consequences unless they align with the political culture and practice of the country, as Levy and Spiller (1996) have argued.

### *Universal access*

The basis for privatization and the extended monopolies that often accompanied them was generally the financial and technological fillip that foreign investment would bring to frequently

outmoded, indebted, and limited incumbent operators. To support the intended extension of networks, a field of multilateral agency and consultancy emerged to devise solutions to address what was termed the “digital divide” – between those with access to voice telephony and the masses of people across the developing world without access.

Strategies, including demand aggregation at telecenters, dedicated universal service levies, obligations, and funds to support services to underserved areas, by and large proved unsuccessful. Though levies, if reasonable, can be tolerated, they weaken investor commitment and require competencies to ensure they are successfully deployed. Large untapped universal service funds exist in developing countries across the world where teledensities remain low. When they are not deployed, as they are not in many parts of the developing world, they represent a double disservice to the poor since they push up the costs and, in turn, the prices of services. The poor, along with the general public, have to pay a premium price to cover the costs of universal service levies, the revenues from which are then not redistributed through universal service allocations. Likewise, the aggregation of demand through the roll-out of telecenters in many countries ironically rarely has been demand driven or entrepreneurially managed. As a result, the skeletons of well-intentioned telecenters that were not sustainable litter the global South.

In contrast to such scattergun approaches to universal service that often benefit those not requiring assistance to access or use communication services, the emerging wisdom after two decades of mainly unsuccessfully seeking to address the digital divide is that more systemic interventions are needed to support effective ways of delivering services. These aim to reduce the “market-efficiency gap” within markets through effective regulation of liberalized markets and are more likely to improve the affordability of services and result in smaller portions of the population requiring assistance in accessing telecommunications services. Resources can be more effectively targeted at the “real access gap” – the difference between the population with service and without service – even under efficient market conditions. There are always likely to be significant numbers of such markets in developing countries, but

significantly fewer than those falling into the “market-efficiency gap” which universal access strategies are devised to target (see Navas-Sabater, Dymond, & Juntunen, 2002).

### *Liberalization*

While markets increasingly became the preferred mechanism for the allocation of resources in the telecommunications sector, they were less than optimal because they did not adhere to the theoretical assumptions about perfect market conditions. The imperfect nature of the telecommunications market, with its infrastructure bottlenecks and high barriers to entry, made the case for social and economic regulation intervention very strong in a bid to ensure fairness (see Baldwin & Cave, 1999) and to deal with the market failure associated with the delivery of services to areas regarded as uneconomic to serve. Even if state owned enterprises do not face direct competition in the market segment in which they operate, fair access and pricing for their facilities needs to be ensured. This, however, is a highly specialized and resource-intensive activity, which developing countries struggle to provide given the capabilities and capacity demands required to conduct this sort of regulation effectively.

The imperfect nature of developing country markets and the inequities that exist within them require strategic regulation to enable innovative service provision, especially to underserved areas, and fair competitive markets to promote the viability of new entrants, which are needed to build the information infrastructure that is necessary for participation in the network economy. Simply removing all market entry restrictions, however, is likely to place an even more onerous burden on already struggling regulators for greater access regulation and is unlikely to inhibit the achievement of other developmental goals. A fundamental restructuring of the market is needed to remove the anticompetitive incentives that exist in vertically integrated market structures, which remain dominant. This is likely to reduce the need for negative anticompetitive regulation, freeing up regulatory resources for more strategic regulation aimed at achieving national developmental objectives.

### *Affordability*

It is for this reason that the central public policy challenge facing African decision-makers responsible for information and communication technology (ICT) remains that of ensuring affordable access to services. Several indices identify the high cost of communications in Africa compared to other developing countries. For example, the Nokia total monthly cost of communication, with the internet premium added to mobile voice calls, ranks most African countries in the middle top price range, with some exceptions such as Ghana and Kenya sprinkled between the lower third of the ranking. This is predominantly occupied by Southeast Asian countries, which enjoy some of the lowest costs of communication in the world. Some of the African states with more expensive tariffs, such as Morocco, Zambia, and Zimbabwe, are in the top third, where most of the Latin American countries – with the highest prices in the world – are ranked (see Mobile for Development Intelligence <https://mobiledevelopmentintelligence.com/statistics/70-monthly-total-cost-of-ownership-usd>). When the affordability of prices in Africa is assessed, for example, against GDP per capita or other income measures, it becomes evident that users at the base of the pyramid are spending in excess of 15% – and as much as 20% – of their income (Gillwald & Stork, 2008). Achieving affordable access to services, however, has to be accomplished while creating the conditions for the development of the information infrastructure – which includes the seamless integration of networks, services, and content – needed to operate a modern economy and participate effectively in global developments. While there may be tensions between these objectives at various points in the development of a modern ICT sector, they should not be viewed as contradictory as they often are. Without an integrated strategy to achieve both developmental and growth objectives, neither will be achieved.

Universal service strategies cannot simply focus on issues of coverage and access. With most access to communications in the developing world provided by mobile operators, effective regulation of this market has become key to ensuring affordable access to communications services. For regulators, this requires a balance

between maintaining an environment for continued investment in next-generation technologies that have driven mobile uptake – particularly of broadband services – while ensuring positive consumer welfare outcomes.

A greater commitment to both the establishment of effective regulatory agencies and the liberalization of markets in order to decrease prices may have addressed these problems, but the sequencing of the reform process is critical (see Levy & Spiller, 1994; Stiglitz, 1998; Wallsten, 2002). Wallsten's (2002) modeling provides evidence of a correlation between effective regulation and sector performance in liberalizing markets, highlighting the importance of establishing institutional frameworks before privatization, on the grounds that those countries where this occurred experienced higher fixed line penetration and investment. These countries were able to sell their telecommunications firms for higher prices than countries without a fully operational regulatory agency. Countries that privatize their incumbent operator alongside the opening up of the market, or afterwards, tend to receive a lower price for the state asset but experience far better performance under competitive conditions. Thus, the longer term gains of competition may be greater than the short-term gains of a high price.

For most developing countries, responding to tied aid (or some other foreign pressure) or simply the incapacity to implement resource-intensive reform strategies successfully meant that the first round of telecommunications reform had mixed outcomes and, in some cases, even a negative impact on affordable access and on sector development (see Gillwald, 2003, with regard to South Africa).

#### *Problems with the orthodox reform model*

These market reforms were comprehensively implemented, however, only in countries in the global North and only by exception in the global South. The impact of these reforms has largely been assessed in well-resourced OECD countries, where they have been hailed as resulting in price decreases, improvements in service quality, faster roll-out of infrastructure, new technologies implemented, and more choice for consumers. Less has been written about why these economic strategies, if they are so obvious, have not been

implemented comprehensively in developing countries. In some of the literature that deals with this, reference is made to the lack of technical expertise and the complexity of regulation, but there is little analysis of the political economy of reform – why privatization was preferred to liberalization – and why, while most developing countries have national regulatory agencies, very few of them are autonomous.

The failure of inadequately reformed markets and the absence of capacity to regulate them effectively are factors that have been shown to have undermined reform initiatives across the global South. These challenges of institutional reform for the telecommunications sector are identified by a number of authors (Levy & Spiller, 1996; Singh, 1999). In addition, the policy and regulatory challenges of this specialized sector are amplified by a wider crisis of the state in many developing countries – that is, by the lack of capacity to govern effectively.

This is evident in the work of those who reject the dichotomization of state and market that came to characterize the neoliberal reform agenda of the 1990s. Without retreating into statism, several authors have pointed out the limitations of the market in resolving allocative issues (Fukuyama, 2005; Stiglitz, 2002). Indeed, the indispensability of the state for transformation of any kind is evident, as Evans (1995) points out – even in the need of those pushing for unqualified market driven reform to get governments to implement the reforms. The nature of state involvement strongly influences whether reform is successful or not. Highlighting the centrality of the state to any outcome, positive or negative, Evans (1995) maintains that there are sector dimensions that influence the roles the state can perform effectively, because of the differing production requirements and modes of governance within each state (Gillwald, 2009): “each sector presents distinctive constraints and opportunities for state involvement. Whether a role or combination of roles fosters the growth of a particular sector depends on the state's capacity to play the roles in question, but it also depends on whether the blend of roles fits the sector” (Evans, 1995, p. 82). Assessing the appropriate role for the state in the telecommunications sector is one of the primary policy challenges in South Africa and throughout the global South. The policy ambiguity on this

matter is a major cause of the suboptimal outcomes in telecommunications experienced over the last decade.

Building on Levy and Spiller's (1994) seminal institutional analysis explaining why foreign "best practices" fail unless they are aligned with local institutions and political culture, Samarajiva's (2000) work on the significance of the legitimacy of the regulator in achieving positive policy outcomes of affordable access to communications contributes to this relatively limited literature, as does Singh (1999). Samarajiva analyzes telecommunication reform outcomes by analyzing the nature of the state and the institutional capacities and resources brought to bear on policy processes and outcomes, providing insight into the political and power relations that mold reform agendas in developing countries.

### Phase 2 Reform: Convergence

While digitization allowed for convergence within telecommunications – for example, between fixed and mobile voice services that previously were operated on separate networks – it also allowed for the convergence of historically distinct platforms for broadcasting and telecommunications, presenting new challenges to policymakers and regulators. It is through new IP (Internet Protocol) based networks that seamless communication across integrated networks can be realized. This has compelled policymakers to create a regulatory framework and licensing regime better suited to the convergence of broadcasting and telecommunication infrastructures. This entails shifting the licensing of silo-like vertically integrated operators in the industrial-era market structure to horizontal service layers – infrastructure, services, and content. Increasingly, it is only the "infrastructure" or "network" layer that requires a license, with the other service layers automatically receiving class licenses on compliance with basic threshold requirements, which might be only registration. This framework is more suited to the IP based networks that have come to dominate communications and the seamlessly integrated information infrastructure necessary for a modern economy. Such networks generally are referred to as next generation networks (NGN) and are evidenced

in the growing number of lower-cost IP based services, such as voice over IP (VoIP) and IP television (IPTV). Initially this took the form of upgrading old cable networks, both broadcasting and telecommunication.

Despite prohibitions on some IP based services in many developing countries, the implication of this type of network for countries with limited infrastructure is that considerably more efficient, IP based networks can be rapidly and flexibly deployed. Thus, while the first phase of policy reform focus tended to be on affordable access to voice services, access to information is now influencing policy and regulatory decision-making.

A range of new challenges exists for policymakers and regulators in this converged environment where content issues need to be dealt with in a technologically neutral way, a view that predominates in this area. Although the idea that policy should not favor a particular digital technology – that is, technological neutrality – was driven by the advent of the internet for general public use and emerged in United States law and then in Europe, the implementation happened over a decade as communication, commerce, and entertainment moved online, and much later in most developing countries, where internet diffusion was slower. In 1997, the US government published the Framework for Global Electronic Commerce, which required that regulatory rules should neither require, nor assume, a particular technology. The Bonn Ministerial Conference Declaration in 1997 summed up the position quite simply, by declaring that all legal frameworks should be applied online as they are offline.

### *Intellectual property rights*

Intellectual property based approaches frequently dictate global legal intellectual property protection norms and, as a result, shape national legal infrastructures. Decision-makers are seeking alternative ways of fostering greater access to information in a digital environment, with many arguing that widespread access to such information means that knowledge can be safeguarded by the creation of digital knowledge commons to which all have access. As Africa becomes more connected, the issues of equality of access

to information and to knowledge are becoming major issues on policymakers' agendas.

New ideas about intellectual property have emerged that appreciate the importance of creators' rights while at the same time recognizing the value to be gained from sharing information. The concept of "open" knowledge and the creative commons approach to intellectual property rights aim to create an environment where people share information in order to build on one another's work, but where creators retain certain rights because of their original contribution. In this approach, the product is then not owned or controlled by any company or country, allowing anyone to use it at minimal cost and without paying licensing fees. The challenge to developing countries is the development of the skills to be able to take advantage of this enormous cost-saving developmental opportunity.

An important aspect of access to knowledge is the right of access to public domain information and administrative procedures to ensure that such access is upheld, which are becoming constituent elements of a new citizenship. The lack of access to public information can prevent full accountability and hamper institutional transparency and accountability. Pressure on governments to adopt policies of openness in relation to networks and information access has developed, especially in relation to software. Open systems – from open source software to open access networks and open data – are challenging conventional wisdom about control of information, access, secrecy, and accountability.

### *Privacy and surveillance*

While the growth of the internet is providing new opportunities for people to express opinions, communicate with others, and participate in the governing process, it raises concerns about how best to ensure individual privacy. Collection, storage, and processing of personal data can be of great benefit to citizens, but it can also be abused. Building trust is one of the major challenges for successfully building online and e-commerce systems. The deployment of large data retention and tracking systems raises issues of ensuring the privacy of users. Policies need to be developed that ensure data protection, safeguard against unreasonable surveillance and cybercrimes, and

protect relevant human rights such as freedom of expression. In many countries in the global South, it is not simply a matter of ensuring that democratic rights are transferred to the digital domain but of establishing them as desirable principles in law more generally.

### *Content and culture*

The convergence of audiovisual media, broadband networks, and electronic devices is generating new opportunities in the ICT and content sectors. Creating new delivery channels for traditional formats and opening the path to the development of interactive content and services are opportunities. While a large volume of information in these new electronic formats is in English and inaccessible to many of the people of Africa, a suitable policy framework that provides incentives for local production and encourages innovation is a major challenge for regulators.

The challenges of implementing technologically neutral policies in practice have been significant, even in more mature economies with experienced and resourced regulators. The primary intention of net neutrality is to ensure that content and application are treated in the same way irrespective of the platform they are delivered on, while at the same time safeguarding access to diverse content irrespective of any vertical relationship that might exist between network operators running downstream content or application businesses. Underlying net neutrality, then, are principles of openness and equality through mandatory interoperability. But attempting to implement it has sometimes had unintended consequences and potentially could limit competition. As Reed (2007) points out: "As the expressed aim behind this element of technology neutrality is to ensure equivalent treatment between different technologies ... We need therefore to recognize that technologically neutral rules addressing the same issue may well differ in their wording and content, in order to achieve the same (or at least broadly equivalent) effects when applied to these technologies." In developing countries, regulators struggling with basic access and early competition issues have either ignored this area of regulation or narrowly applied the principles of technical neutrality – often with the same unintended outcomes.

The implication is that most developing countries are marginalized from global governance, agenda setting, and development of regulatory practice in many areas. As the reform agenda moves to internet based networks and services with global operators and service providers and multiple producers of content, regulation on these issues is shifting away from national sovereign states to international governance bodies. Institutions such as the International Corporation for the Assignment of Names and Numbers (ICANN), responsible for the technical coordination of the internet, on which countries do not automatically have representation as they do in other United Nations governance forums such as the International Telecommunication Union or the World Intellectual Property Organization, leave developing countries feeling excluded from decisions that affect their national interests.

### Phase 3 Reform: The New Digital Divide

Universal access to communication services was a developing country policy issue several decades ago. Many countries in the global South were struggling to increase basic voice service penetration from the less than 2 or 3% using fixed lines. Despite the advent of mobile communications, many countries initially struggled to get mobile voice penetration levels up to 20%. As access to voice services has increased with the proliferation of mobile communications, with many of these countries now enjoying penetration levels of over 50%, a new gap – between those with access to broadband services and those without – has emerged. With such networks and services regarded as a necessary condition for the development of information societies and knowledge economies, access to, and the price and quality of, services and networks are increasingly significant policy issues. This is now the case for more developed economies which managed to ride the first wave of broadband by upgrading existing copper and cable networks. They now face the challenge of massive investment to build fiber backbone networks and, in more developed countries, high-speed access networks.

Consumer access to high quality broadband services is predicated on national networks capable

of supporting the rapid growth in traffic at competitive prices. Under such conditions, research suggests that an increase of 10% in broadband penetration can produce a 1% increase in GDP output (Kim, Kelly, & Raja, 2010), arguably more likely in developing countries. After three decades of telecommunications reform, globally, that saw telecommunications shift to a largely liberalized and privatized sector in which investment risk was transferred from the public sector to the private sector, the state is emerging again as a key player in broadband strategies around the world. The scale of investment required to build NGNs means that, especially in developing economies, neither the state nor the private sector is able to meet the broadband needs of countries. This reality has resulted in a new interplay between state and market in several jurisdictions and is creating new delivery, investment, and business models.

Early evidence from some national experiments is that partnerships between the state and private investors and operators can be key enablers of broadband infrastructure development. Success remains dependent, however, as in the past, on high levels of state coordination, a sophisticated skills set within government, and more flexible bureaucratic processes to manage innovative funding models, together with well resourced and capable national regulatory agencies, with the appropriate institutional arrangements to enable this.

While universal access to broadband is a policy issue common to countries across the globe, broadband has evolved very differently in the global South compared to the more mature markets in the North, presenting different public policy and regulatory challenges. Assumptions based on experience in the global North about the primary means of broadband access, as well as the cost and quality of fixed versus mobile broadband services underpinning “best practice” broadband policy, are being challenged, particularly in the African context.

### *More wireless broadband connectivity than fixed*

Unlike more mature markets where fixed services are the predominant broadband platform,

in Africa mobile networks provide the primary means of broadband access. Massive demand for voice services was met through the wireless revolution that transformed communications on the African continent; and demand for internet service by those unable to access the limited asymmetric digital subscriber line (ADSL) services using fixed line infrastructure on the continent has been met by mobile service providers. In contrast to established telecommunications markets in the global North, where ADSL-upgradable copper networks or upgradable cable networks were pervasive at the advent of broadband, in Africa most fixed line networks reached less than 1% of the population and higher capacity fiber connectivity remains negligible.

Dependence, typically, on monopolistic provision of fixed infrastructure for broadband delivery constrained internet penetration in the global South. With limited fixed line infrastructure, the fixed line operators on the African continent do not enjoy the economies of scale enjoyed by operators in the North (or by mobile operators in the South). In most countries on the continent, the incumbents also tended to have a monopoly on undersea cable access, with international bandwidth constituting up to 80% of the costs of local internet service providers. This contributed to the lack of affordability of internet services.

The breaking of the telecommunication operator incumbent monopoly on international bandwidth for many countries in the global South with the introduction of undersea cable competition in many parts of the world since 2008 rapidly changed the pricing structure. Wholesale international bandwidth is now a fraction of what it was (although these benefits have not always been passed on fully to end users to stimulate service take-up). This change enabled – and was driven by – the introduction of broadband mobile technologies, leading to constantly reducing prices for smarter devices and services and to marketing innovation which fueled the uptake of broadband services.

With no monthly line rental charges and installation fees and convenient prepaid charging options, in addition to the lower set-up costs of mobile data compared with fixed data services, particularly for low data use and uneven consumption, the dominance of mobile service is

unsurprising. For these reasons, many African home users opt to use a 3G (third-generation mobile standard) dongle modem or mobile handset to access the internet instead of setting up an ADSL fixed line connection, which is often not available and, if it is, is unaffordable. The way that mobile broadband has evolved in Africa means that mobile broadband (3G and 4G LTE – long-term evolution, a standard for higher speed mobile phones and data terminals) is often faster and cheaper than the first-generation copper network upgrades (Gillwald, Calandro, & Chetty, 2013). Significant mobile broadband take-up was constrained initially by the requirement of a computer into which dongles had to be plugged.

Wireless mobile broadband is not only the primary means of access to the internet in Africa for individuals, but, unlike in more mature markets, it is also generally cheaper. It is also faster than fixed services in the growing number of markets deploying 3G and 4G mobile wireless technologies. With dependence on wireless technology that is inherently less stable than fixed broadband technologies, the implications of not having ubiquitous, reliable, always-on, high-speed connectivity for the economy are serious. While data services are being used to make voice calls and private paid-for SMS is giving way to free instant messaging services, generally meeting the needs of ordinary users, the lack of always-on, high-speed, and quality bandwidth in the access networks (last mile) required by business, public institutions, and citizens impacts negatively on a country's informational development – a key determinant of global competitiveness. There are persistent debates on whether improved service should be achieved by facilities based competition or by avoiding infrastructure duplication through national open access broadband networks on which service based competition can be enabled. In the meantime, the immediate relief provided by wireless and mobile services to bandwidth starved consumers across the developing world has resulted in a massive rise of data traffic. The critical policy issue is no longer international bandwidth but the development of terrestrial backbone and backhaul networks, because historically dimensioned backbone networks for low bandwidth voice services mean that the capacity of these networks is becoming extremely strained.

While operators have reconfigured their use of existing radio frequency spectrum bandwidth to offer limited next-generation access networks, mobile broadband is being stymied by lack of access to optimal spectrum in many parts of the continent. The institutional challenges associated with the allocation of spectrum bandwidth and the migration of analog terrestrial broadcasting to digital mean that service innovation, tax revenues, and potential job opportunities have been squandered, since the process is not effectively managed with a view to maximizing the benefits for citizens. With growth in data revenues outstripping traditional voice revenues and clearly becoming the major source of revenue for the future, mobile broadband is where the competitive pressure in the broadband market is focused. While African consumers with access to broadband services are benefiting from stiff price competition between mobile operators seeking to attract and retain data customers, it cannot be assumed that these developments in this more liberalized segment of the market in most African countries means that issues of affordable access have been addressed.

The relatively high price of broadband in Africa remains a challenge, not only because of its negative impact on the exponential growth in broadband required for Africa to catch up with the rest of the world, but also because of the high input cost it represents for enterprise on the continent and the negative consequences for growth, development, and global competitiveness. The invariably poor broadband penetration levels across countries are primarily the outcome of high prices. The high prices and poor quality of fixed line broadband services reflect the absence of competition in contrast to the more competitive mobile segment. While international bandwidth prices, once the major factor in South African data prices, for example, have plummeted, terrestrial and internet transit prices are now major cost drivers. The impact of these factors on the cost of communications is a key area for regulatory assessment, as are any policy and regulatory bottlenecks that constrain operators and potential players from responding dynamically to the changing nature of telecommunications.

Major policy challenges beyond fundamental ones such as lack of access to electricity and

very low average income levels remain for most developing countries, if they are to create the conditions for investment in networks to deal with demand for high-speed services required by large users. Achieving an enabling policy and regulatory framework conducive to investment, the rationalization of existing infrastructure, and the coordination of infrastructure planning while, at the same time, stimulating demand through affordable pricing, are key challenges for African countries wishing to develop their societies and economies and become globally competitive.

**SEE ALSO:** Access to Infrastructure; Competition/Antitrust/Antimonopoly Law; Content Regulation; Digital Divide(s); Freedom of Expression and Professional Status; ICT4D; ICT4D Donor Agencies and Networks; ICT4D and Local Access; ICT4D and Mobile Communication; Internet Governance; Internet Telephony; Media Diversity Law and Regulation; Mobile Communication Development; Mobile Communication Law; Multistakeholder Partnerships; Network Neutrality; Privacy Law and Policy; Public Service and Community Media; Search Engines Law and Policy; Social Media Ownership

## References

- 
- Baldwin, R., & Cave, M. (1999). *Understanding regulation*. Oxford, UK: Oxford University Press.
- Bergman, L., Doyle, C., Gual, J., Hultkranz, L., Neven, D., & Roller, L. H. (2000). *Europe's network industries: Conflicting priorities*. London, UK: Centre for Economic Policy Research.
- Evans, P. (1995). *Embedded autonomy: States and industrial transformation*. Princeton, NJ: Princeton University Press.
- Fukuyama, F. (2005). *State building: Governance and world order in the twenty-first century* (2nd ed.). London, UK: Profile Books.
- Gillwald, A. (2003). Transforming telecom reform: The case of South Africa, Amartya Sen and Michael Spence, Dialogue on ICT and Poverty, IDRC Harvard Forum. Retrieved from [http://www.idrc.ca/en/ev-46262-201-1-DO\\_TOPIC.html](http://www.idrc.ca/en/ev-46262-201-1-DO_TOPIC.html)
- Gillwald, A. (2009). *Wire less: A decade of telecommunications reform in South Africa*. PhD thesis, Witwatersrand University, South Africa.
- Gillwald, A., & Stork, C. (2008). ICT access and usage in Africa: Towards evidence-based policy and

- regulation, Vol. 1. Policy Paper 2. Retrieved from [http://www.researchictafrica.net/publications/Towards\\_Evidence-based\\_ICT\\_Policy\\_and\\_Regulation\\_-\\_Volume\\_1/RIA%20Policy%20Paper%20Vol%201%20Paper%202%20-%20ICT%20Access%20and%20Usage%20in%20Africa%202008.pdf](http://www.researchictafrica.net/publications/Towards_Evidence-based_ICT_Policy_and_Regulation_-_Volume_1/RIA%20Policy%20Paper%20Vol%201%20Paper%202%20-%20ICT%20Access%20and%20Usage%20in%20Africa%202008.pdf)
- Gillwald, A., Calandro, E., & Chetty, M. (2013). *How do mobile and fixed stack up?* RIA Policy Brief No. 2. Retrieved from [http://www.researchictafrica.net/docs/SA\\_Policy\\_Brief\\_2013\\_No\\_2\\_%20July2013%20final%20webversion.pdf](http://www.researchictafrica.net/docs/SA_Policy_Brief_2013_No_2_%20July2013%20final%20webversion.pdf)
- Kim, Y., Kelly, T. J. C., & Raja, S. (2010). *Building broadband: Strategies and policies for the developing world*. World Bank Publications. Retrieved from [www.infodev.org/articles/building-broadband-strategies-and-policies-developing-world](http://www.infodev.org/articles/building-broadband-strategies-and-policies-developing-world)
- Levy, B., & Spiller, P. (1994). The institutional foundations of regulatory commitment: A comparative analysis of telecommunications regulation. *Journal of Law, Economics and Organization*, 10(2), 201–246.
- Levy, B., & Spiller, P. (1996). *Regulations, institutions and commitments: Comparative studies of telecommunications*. Cambridge, UK: University of Cambridge Press.
- Majone, G. (1994). The rise of the regulatory state in Europe. In W. C. Mueller & V. Wright (Eds.), *The state in Western Europe: Retreat or redefinition?* Special Issue of *West European Politics*, 17(3), 77–101.
- Mansell, R. (2005). Strategic interests in information societies. In N. Garnham (Ed.), *Contradiction, confusion and hubris: A critical review of European information society policy* (pp. 19–26). Brussels, Belgium: ENCIP.
- Melody, W. H. (2000). *Telecom reform: Principles and regulatory practices* (2nd ed.). Lyngby, Denmark: Den Private Ingeniørfond.
- Melody, W. H. (2005). On muddling through contested terrain. In N. Garnham (Ed.), *Contradiction, confusion and hubris: A critical review of European information society policy* (pp. 52–60). Brussels, Belgium: ENCIP.
- Navas-Sabater, J., Dymond, A., & Juntunen, N. (2002). *Telecommunications and information services for the poor: Toward a strategy for universal access*. Washington, DC: World Bank.
- O'Siochru, S., Girard, B., & Mahan, A. (2002). *Global media governance*. Lanham, MD: Rowman & Littlefield / United National Research Institute for Social Development.
- Reed, C. (2007). Taking sides on technology neutrality. *SCRIPT-ed*, 4(3), 263–284.
- Samarajiva, R. (2000). Establishing the legitimacy of new regulatory agencies. *Telecommunications Policy*, 24.
- Singh, J. (1999). *Leapfrogging development? The political economy of telecommunications*. New York, NY: State University of New York Press.
- Stiglitz, J. (1998). *Knowledge for development; Economic science, economic policy and economic advice*. World Bank 10th Annual Conference on Development Economics. Washington, DC: World Bank.
- Stiglitz, J. (2002). *Globalisation and its discontents*. London, UK: Penguin.
- Wallsten, S. (2002). Does sequencing matter? Regulation and privatisation in telecommunications reforms. *World Bank Policy Research Working Paper*, (2187).

### Further Reading

---

- Laffont, J.-J., & Tirole, J. (2000). *Competition in telecommunications*. Cambridge, UK: Cambridge University Press.
- Mansell, R. (2004). Political economy, power and the new media. *New Media and Society*, 6(1), 74–83.

**Alison Gillwald** is Executive Director of Research ICT Africa, a policy and regulatory think-tank based in Cape Town. She is adjunct professor at the Management of Infrastructure Reform and Regulation Programme at the University of Cape Town Graduate School of Business. Prior to this she was Associate Professor at the Witwatersrand University's Graduate School of Public and Development Management, where she founded the Learning Information Networking and Knowledge (LINK) Centre in 1999. She served on the founding Council of the South African Telecommunications Regulatory Authority and the first Independent Broadcasting Authority. She was founding editor of the *African Journal of Information and Communication*.