



# **Equitable access People, networks and capabilities<sup>1</sup>**

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<sup>1</sup> This paper is part of a series on equitable access to ICT infrastructure commissioned by APC for an event on equitable access which took place in Rio de Janeiro in November 2007. The papers and commentaries on these papers can be found at: [www.apc.org/en/pubs/research](http://www.apc.org/en/pubs/research)

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## Executive summary

Communications policy is complex. It involves a wide range of actors: international and national, government and business; very diverse consumer groups, from global businesses to marginalised rural households; a constantly changing array of technologies; and rapid market evolution. It is hard indeed for anyone, at any level, to keep track of what is going on.

Even something so large-scale as infrastructure is in a constant state of flux. The last ten years have seen extensive roll-out of networks into areas that were never previously served, bringing telephony to the majority of citizens where it had been available only to businesses and urban elites. New types of network – most obviously wireless and broadband networks – have supplemented and, in the case of wireless, sometimes displaced those that were previously dominant. The economics of infrastructure deployment have been transformed by new technology and market liberalisation.

Policy-makers and regulators sit at the centre of this massive change. The decisions they make – to allow certain types of investment, to foster interconnection, to license according to technology or without technological constraints etc. – have an impact on the pace and nature of infrastructure deployment. This in turn has an impact on the communications opportunities available to citizens and businesses, and on the potential for communications to contribute to economic growth and individual empowerment. Yet the capacity/capability that policy-makers and regulators have to intervene is constrained by a lack of knowledge of market developments, the unpredictability of new technology, the potential impact of different regulatory approaches, and (sometimes) weak relationships with powerful actors in government and business. Improving their capabilities, and those of industry actors in general, to predict and innovate amidst change and uncertainty could do much to increase the pace of infrastructure deployment and maximise resulting social and economic returns.

Similarly, the use of communications by citizens and businesses is constrained by factors beyond the mere availability of infrastructure. Studies of the business use of information and communications technologies (ICTs) suggest the importance of achieving a critical mass of network users, a density of use beyond which adoption of new communications opportunities tends to accelerate. Affordability is important here, for both businesses and citizens, but so is saliency or relevance: the extent to which the use of new facilities adds sufficient value to make it worth affording them. Capacity, or capability, is again important. The value of many new opportunities – including the internet – is unlocked by skills which are not widely available within poor communities.

This issue paper is one of a series of four on aspects of equitable access to infrastructure commissioned by the Association for Progressive Communications (APC). It begins by defining some key terms, and then seeks to place access issues within the overall context

of communications policy. It also raises a number of issues regarding capacity and capability, both of decision-makers and of consumers of communications services.

## 1. Context

The term “access” is used in discussions of communications policy to mean two distinct things. It is important to avoid confusing them.

It is used, technically, to mean the access which competitors and service providers have to network infrastructure owned by major communications companies. It is a core principle of many regulatory regimes that network owners should provide network access to other communications businesses on terms that are transparent and non-discriminatory, using cost-based charges that enable competitors with limited or no infrastructure of their own to offer services on fair or equal terms. Regulatory regimes themselves can be more or less open in the access they offer different operators – for example, the way they regulate interconnection rights and allow operators to establish independent international gateways. APC has been among agencies advocating “open access” to infrastructure for all network and service providers.

“Access” is also used to refer to the access end-users have to network facilities and the services that run over them. A core objective of many governments and regulators is the achievement of “universal access”, or the availability of networks and services in all communities, no matter how remote. This requires extending the reach of existing networks into areas that have not been considered commercially viable, or (in a few cases) establishing alternative networks in unserved areas before connecting these to those serving the wider national territory.

There are synergies between the two meanings of “access”. For example, more open access to network infrastructure can have a substantial impact on the ability of market entrants to address unserved geographic areas, while the competition it fosters tends to reduce prices and increase diversity of service – both consumer gains. However, the two meanings are quite distinct, and it is important to be clear, when discussing access, whether the discussion refers to network access (meaning 1) or consumer access (meaning 2).

“Equitable access”, likewise, means different things in different contexts. In its technical, regulatory sense, equitable access can be taken to mean a regulatory framework that maximises the ability of competing businesses to address market opportunities by freely using whatever mixture of existing and new infrastructure best suits their purpose.

“Equitable”, here, is associated with the concepts of fairness that underpin competition law (which is enacted in many countries and whose principles generally underpin regulatory assumptions elsewhere). In this sense, exclusive rights for former incumbent operators

over facilities like international gateways are *not* "equitable", while market entrants' rights to non-discriminatory interconnection are.

"Equity" should not, of course, be confused with "equality". The development of communications regulation can be divided into two phases – a "liberalisation phase", in which the main purpose of regulation is to foster transition from monopoly to competitive markets, and a "competition phase", which follows once competition has become established. During the liberalisation phase, regulators seek to eliminate existing inequalities between market participants, especially those resulting from the control over infrastructure and other resources held by former monopolies. In this phase, "equitable" regulation is often asymmetric, enabling market entrants to do things denied to an incumbent. It is only when competition is established that equity implies the level playing field characteristic of other areas of competition law.

When it comes to consumer access, "equitable" has a more normative, developmental meaning. In this context, it is generally taken to mean that access to network services should not be dependent on social advantages (wealth, education, landownership, gender, etc.), but should be as easily available to the disadvantaged as to their more advantaged neighbours.

Access in this sense is not simply a matter of infrastructure. From the end-user's point of view, it is the services that infrastructure enables that matter, rather than infrastructure itself. Obviously, access to these services is not available within a community if infrastructure itself has not reached that community. (It is, however, available to community members who can easily and affordably travel to locations that networks have already reached.) But *meaningful* or *worthwhile* access to services does not result from infrastructure alone.

Whether or not people are able or choose to make use of services depends on:

- *Affordability, i.e., the extent to which making use of services represents an efficient use of their own economic resources.*
- *Ease of use, i.e., the extent to which the benefits of services can be unlocked with existing skills or skills that can be easily acquired.*
- *Saliency, i.e., the extent to which the service concerned offer value because they provide things which add to their quality of life or livelihood.*

These factors tend to result in greater use of new resources by those who are socially advantaged rather than disadvantaged. However, "equity" here, too, should not be confused with "equality". What matters to end-users is the extent to which they can unlock the potential that new resources have to improve *their own* lives and livelihoods. For different people, this means different things.

Different services have different user profiles. Telephony, for example, is much easier to use, is more affordable and has more predictable costs than the internet. Internet use has higher skill requirements, which are often poorly available in remote communities and, as a result, tends to be more skewed towards the socially and economically advantaged than is the use of telephones. Measures to address disadvantages of affordability and skill distribution are central to efforts aimed at making the value of consumer access to the internet more "equitable".

## 2. Strategic approaches

Although different, the two meanings of "access" described above do coalesce to some extent around a vision of communications which is held by many governments, businesses and other stakeholders. Most communications policy-makers envisage a future society in which ICTs play a greater role. Some see this leading to an information society in which knowledge displaces agricultural or industrial production at the core of economic life. Most are more cautious, but nevertheless anticipate the communications sector contributing more substantially to core development objectives, particularly in four areas:

- *The enhancement of national productivity and output*
- *Improved service delivery (of both government and commercial services)*
- *Improvements in local opportunity and economic growth*
- *The empowerment of individual citizens.*

The capacity and capability of communications networks and users is important here. To understand this, it is helpful to look at the question from both supply and demand sides of infrastructure provision. The supply side is essentially concerned with network infrastructure itself – with technology and the economics of deployment. Inside government, this is largely handled by ministries of communications and sector regulators. The demand side is more concerned with consumer use, and so pays more attention to services (rather than infrastructure per se) and to patterns of communications behaviour. Inside government, this is more a matter for line ministries and local administrations, often working in conjunction with local and civil society delivery organisations.

Most communications sector policies seek to achieve an enabling environment for the social and economic objectives listed above through a series of supply-side interventions. These include sector restructuring (such as privatisation and opening markets to foreign direct investment), liberalisation, pro-competitive regulation, and efforts to extend the geographical reach of existing networks (such as universal access strategies). They pay much less attention to the demand side of communications provision – to the dynamics of existing communications markets, and to the capacity of users to draw value from network-enabled services. In some cases, the achievement of such benefits has been thought an inevitable outcome of network provision. In practice, this is not so: unlocking

the potential benefits of access, particularly for the poor and marginalised, often requires intervention on the demand side as well as the supply side of infrastructure provision. In particular, attention needs to be paid to building user capabilities.

Infrastructure itself is necessary but not sufficient to achieve equitable access. Translating its provision into equitable access, and achieving desired developmental outcomes, requires a more holistic view of the ICT sector and its place within society and the economy. This, in turn, requires policy-makers, regulators and other stakeholders to think about supply *and* demand, infrastructure *and* services, national *and* local levels of provision, within a single, common frame of reference; and it requires that common frame of reference to be carried through from policy to implementation. Although a good many governments have adopted ICT policies that aim to coordinate ICT and development policy, the capacity to implement these has often been weak, particularly when responding to local diversity.

Part 3 of this paper looks briefly at some of the implications of these points in three areas: the capability of networks, of policy-makers and regulators, and of consumers or end-users. Before this, however, it is important to recognise three challenges faced by all concerned with developing equitable access and building these capacities. Each of these challenges results from the rapid pace of change experienced within the communications sector, which means that the ground is constantly shifting beneath the assumptions made by policy-makers, regulators and investors.

Firstly, there is continual rapid change in technology. Each year, new technologies and variations of existing technologies enable improvements in networks and service (including cost reductions and quality/speed/capacity increases) and facilitate new kinds of services. Very often, these innovations challenge established industry practice, particularly when they disaggregate markets or cross boundaries between market segments that were previously distinct. Satellite (VSATs) and internet telephony are two examples of quite simple technologies that have challenged existing regulatory paradigms. As technology becomes more diverse and complex, and its potential becomes increasingly unpredictable, policy-makers are recognising that they are poorly placed to make technological choices. Regulators in the European Union, India and Tanzania are among those that have moved to a technology-neutral approach, leaving technology choice to businesses with greater expertise. However, even these regulators still have to make decisions which affect the viability of different technologies, for example, where standards and spectrum allocation are involved.

Secondly, rapid change is taking place in markets. The most obvious example here is the adoption of mobile telephony in areas which previously had little or no fixed connectivity. In Uganda the fixed telephone network reached only about 60,000 subscribers in a narrow geographical area in the mid-1990s – a teledensity of under 0.2%. By late 2007, wireless networks had a teledensity of around 15% and were continuing to grow rapidly, with some

85% of the national population living in areas with connectivity. Uganda's experience – typical of many countries – illustrates the most rapid expansion of any technology-based service at any time. It was not predicted by many in the industry, and the future dynamic of network growth is also unpredictable. Regulators and businesses alike need to track changes in the market such as these, and in the networks serving it, if they are to make appropriate decisions.

The third area of rapid change lies in user behaviour. Information and communications patterns are well established in all societies, and new technologies relate to these in complex ways. Where they offer the opportunity to do something which is valued, affordable and hitherto unachievable, their adoption tends to be rapid. This is the case with mobile telephony, which increases opportunities for family and social networking and helps reduce vulnerability at times of crisis.

Usually, however, new technologies supplement rather than replace existing information and communication channels, and changes in behaviour are therefore gradual. Users need to build confidence in new resources before they consider them viable alternatives to those they know and trust. There is evidence that this (along with high costs and the low relevance of existing content) has inhibited internet adoption in many communities. The issue of user confidence may be particularly relevant among the poor, who are more likely to be cautious about expenditure on new resources. Nevertheless, habituation and growing confidence in new resources do bring about changes in behaviour. As a result, demand for network-enabled services may be very different three years after their deployment than in the first few months.

These three aspects of rapid change are crucial factors for infrastructure investment, and very difficult to measure. Businesses and regulators alike will be better able to stimulate equitable access if they have the capability to measure them effectively.

### **3. Network capacity and capacity building**

Capacity constraints limit the impact of communications networks and services at many different points in the communication supply chain. This section of the paper looks at implications of the issues described above for this in three specific areas: networks themselves, policy-making and regulation, and consumer use. The aim here is not to be comprehensive – these areas are not closely aligned with one another – but to raise issues of particular significance, and suggest that a more holistic understanding of capacity requirements may enable businesses and policy-makers to achieve better commercial and developmental outcomes.

The first set of issues to be discussed here concerns networks themselves. Historically, both businesses and regulators have taken a supply-side approach to building networks.

The extent to which networks have been deployed has been determined primarily by whether anticipated operational revenue will be sufficient to recover the capital cost of network roll-out. For much of the twentieth century, policy-makers assumed that communications infrastructure markets were natural monopolies.

Since the 1980s, this natural monopoly paradigm has been replaced by a competitive market paradigm - by the assumption that competitive markets will deliver more consumer value in communications than monopolies. Several factors have driven this. Firstly, new technologies, particularly wireless, have drastically reduced the capital cost of network deployment. Secondly, they have enabled more services (old and new) to be delivered more affordably over existing networks, so increasing the revenue return on network investment. And thirdly, policy-makers and regulators now understand that service provision can be structurally separated from network ownership. Together, these factors have transformed the economics of communications networks and brought about unprecedented expansion into previously unserved areas.

Networks can be designed with different capabilities in mind. This may involve further changes of paradigm. Although the economic assumptions have changed, network design is still generally seen as a matter of extending large-scale networks outwards from the centre, which is currently served, to the periphery, which is not. This model has been and continues to be effective in most cases. However, building large-scale networks outwards from the centre means that communities are offered a common and average service type and standard, which may over- or under-provide for their specific needs. Evidence from community networks suggests that in some cases it may be more cost-effective to build inwards from the periphery rather than outwards from the centre, creating a business case for network access built around local demand and alternative technologies, rather than the common costs of centralised infrastructure.

The second set of issues concerns the capabilities of policy-makers and regulators. Achieving equitable access requires them to have a depth of understanding and expertise which is difficult to achieve, particularly in under-resourced bureaucracies. There are three key areas in which, it is suggested, capacity and capability could be enhanced.

The first of these also concerns the relationship between existing ICT thinking and more general approaches to social and economic development. At present, there is often a "paradigm gap" between the perspectives of ICT and development policy-makers. While many countries have established national ICT for development strategies, the implementation of these has often been weak. Often, as mentioned above, ICT policy-makers see issues of access and development in terms of extending networks to the margins, while development policy-makers are more focused at the community level and at meeting communities' perceived needs. Few countries, however, have sought to bring together communications and other infrastructures (power, water, transport) into a single community development model. More integrated approaches to infrastructure

development of this kind might offer better outcomes for both industry and the community, but can only be achieved through enhanced dialogue between different arms of government and greater stakeholder engagement in policy-making. This is relevant at both national and local levels.

The second area concerns the evidence base for determining policy-oriented interventions. The evidence base on information and communications in developing countries is notoriously weak, partly because the issues are relatively new on the agenda and partly because rapid change in technology and markets makes impact assessment particularly difficult. Nevertheless, there are ways in which understanding can be improved. Clear assessment of the e-readiness of any community (national or local) to make use of infrastructure access helps regulators design enabling frameworks for investment and operators to make better investment decisions. Communications audits at the local level can identify local characteristics and differences which can be built into the "last mile" segments of infrastructure deployment, not least where user behaviour is concerned. These add to the capability of regulators and others to promote more equitable access.

Thirdly, regulators and policy-makers need a stronger understanding of developments within the sector and the likely impact of decisions that they make. Many regulators are finding from experience that markets tend to develop best when they are least constrained, i.e. when it is easiest for businesses to innovate in terms of technology and service provision. This is not surprising in a sector subject to such rapid technological change. In these circumstances, regulators are finding that they need to combine two different approaches. On the one hand, they need to foster innovation and experimentation, for example through technology-neutral licences. These measures often relax regulatory controls. At the same time, they need to intervene assertively to ensure that innovation and experimentation are not constrained by network owners with substantial market power – for example, by requiring them to open up their networks to competitors on non-discriminatory terms. They need to do this in a constantly changing environment, where new technologies frequently disrupt existing regulatory arrangements.

Most regulators worldwide recognise the vital role of capacity building in enabling them to fulfil their mandates. The expertise required in regulatory authorities needs to be continually refreshed to deal with changing technological and market circumstances. Although every market is different, there is much to be gained from shared experience, and partnerships like NetTel@Africa can do much to foster this.

The final set of issues here concerns the capabilities of consumers. Meaningful access depends as much on end-users' capacity to make use of networks and services as it does on the availability of those networks and services themselves. Affordability is obviously a critical factor here. So, as noted earlier, is saliency: services will only be used by people if they offer something which they consider worth the price they have to pay. Often this is

discussed in terms of “local content” (although “content which is valued locally” might be a better term). Our main concern here, however, is with capabilities.

Two types of capability are particularly important at a community level. The first is concerned with the supply side of local facilities. This includes, for example, capabilities to tailor supply to local requirements, such as the micro-level retailing of services (availability of payphones, reselling of capacity on mobile phones); basic business skills and resources (to establish and profitably manage telecentres and other public access facilities); and the installation and maintenance skills required to keep such facilities online.

User capabilities, however, are also crucial, particularly where the internet is concerned. These include the acquisition of relevant skills, i.e. those skills required to access resources in ways which suit people’s own needs and offer them real worth. These are not just basic skills such as literacy, but also the research skills which enable people to find information of value on the internet and to discriminate between worthwhile and worthless resources. The role of information intermediaries will often be crucial, where such skills are rare, in transmitting knowledge to the poor and marginalised.

There is insufficient space here to explore these issues in much depth. However, it should be noted that local capabilities like these are rarely emphasised when infrastructure networks are designed. In practice, efforts to enhance user capabilities can have a significant impact on demand, and on both technological and economic aspects of network design. More attention should be paid to them.

## **4. Conclusion**

This paper has ranged over a number of issues, necessarily so, because of the imprecision of some of the key terms with which it deals (e.g., “access”, “equity”, “capacity” and “capability”).

The overriding theme of this paper has been that infrastructure alone is insufficient to achieve equitable access. While this may seem obvious, the predominance of supply-side thinking on network development – focused on technology and network economics – has meant that demand-side questions such as affordability, saliency and capacity/capability have been under-represented in the infrastructure debate. The paper argues that more attention should be paid to these demand-side (and often local) factors if the potential of infrastructure is to be translated into equitable access, including services which are of value to communities, and if the commercial and developmental returns on infrastructure investment are thereby to be maximised.

Networks require sufficient capacity to meet today’s needs and scalability to meet those of uncertain future levels of demand. This is not just a matter of technology, but also of

policy and regulation. Policy-makers and regulators need more knowledge of the circumstances of the communities with which they deal, more understanding of the relationship between infrastructure networks and development outcomes, and more sharing of expertise across international borders.

Ultimately, however, it is the final users who determine whether infrastructure offers access that is meaningful to them. End-users need greater capacity and capability if they are to gain substantial value from new resources, especially new resources with complex skill requirements and uncertain financial costs (such as the internet). If policy-makers and regulators want to maximise developmental impact, they need to address skill deficits among the poor and marginalised as well as infrastructure deficits and regulatory constraints.

While these different capacity issues arise at different points in the communication supply chain, they all contribute to the overall commercial and developmental viability of communications markets. We would all gain if policy-makers took a more holistic and cohesive approach to building capabilities across the supply chain as a whole.