

Strengthening National Information
and Communication Technology
Policy in Africa:
*Governance, Equity and
Institutional Issues*

Melvin Ayogu

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List of Abbreviations and Acronyms

ADF	African Development Forum
AIC	African Internet Connectivity
AISI	African Information Society Initiative
CATV	Community Antanae Television
DRC	Democratic Republic of Congo
GPRS	General Pocket Radio Services
ICT	Information Communication Technologies
IP	Internet Protocol
ISP	Internet Service Provider
IT	Information Technology
ITU	International Telecommunication Union
NBER	National Bureau of Economic Research
SADC	Southern Africa Development Community
TLD	Top Level Domains
TRIPS	Trade Related Intellectual Property Rights
UNECA	United Nations Economic Commission for Africa
USO	Universal Service Obligations
WAP	Wireless Application Protocol
WTO	World Trade Organization

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1. Introduction

This paper provides a framework for a research agenda on governance of information communication technologies (ICTs) in Africa. It addresses the background, importance and developments in ICTs in general and the governance in particular. The paper also reviews events in Africa and elsewhere, highlighting the importance of governance of ICTs for growth and development in the continent.

1.2 Nature of ICTs

1.2.1 Digital convergence

Digital convergence is a new term that describes the merging of applications, such as the media, computers and telecommunications. The centerpiece of this fusion is ICT and the attendant amenities. Telecommunications is the process of moving data: audio information (sound) and video information (pictures) over long distances through transmission lines. The basis of transmitting data and sound over media is the digital communication technology. The three main domains of telecommunications are audio transmission, video transmission and data communications (or digital transmission)¹.

1.2.2. Communication links

These are the physical means that link the elements of the system; transmit and receive information. Communication links consist of the hardware and circuitry that join computers and terminals (or client equipment) permitting the flow of traffic between them. Transmission media may consist of coaxial cables, copper wires, fiber optics, cellular radio, satellite links and microwave or radio wave circuits. A communications network can provide many types of service. The three types of commonly used transmission circuits categorized according to direction of traffic flow and volume of transmission are simplex, half duplex and full duplex. The most basic type of service is the simplex. This service provides one way communication, such as in radio or television broadcast. Simplex channels are not often used because it is not possible to send error or control signals to the transmission

¹ This framework paper has benefited from many sources, including the author's experiences, and though not always specifically cited in the text, all of the sources consulted are listed in the bibliography. The technical details in this section rely mainly on Peterson (2000).

end. A half duplex channel can send and receive transmissions, but not at the same time. Only one end transmits at a time, while the other end receives. Additionally, it is possible to perform error detection and request the sender to retransmit information that arrived corrupted. Internet surfing and talk-back radio are examples of half duplex. Full duplex is a channel that allows two way communications simultaneously. There is no need to switch from transmit to receive mode like in half duplex. It is like a two-lane bridge on a two-lane highway. An example of a full duplex is a television talk show where the host has a number of people talking at the same time.

1.2.3. Data transmission speed (bandwidth)

Bandwidth refers to how fast data flows on a given transmission path or the transmission capacity of these lines. An Internet Service Provider (ISP) pumps communications bandwidth, or Internet connectivity through electric 'pipes' that connect a computer to the Internet. These pipes are wires and they take a variety of forms, from standard telephone lines to cables and leased lines. Bandwidth is proportional to the amount of data transmitted or received per unit of time, and the transmissions are measured by how many bits of data cross the wire each second. Slower transmission speeds are measured in kilobits per second (kbps), while faster transmissions are in megabits (Mbps) or gigabits (Gbps).

The volume of data and the speed of transmission depend on the grade of the lines. The higher the grade the higher the capacity. These are classified into narrowband, voice grade, and wideband. Narrowband is a comparatively thin slice of bandwidth for transmitting sound and data signals. At operating speeds of 2.6 kbps per second to 1.54 Mbps per second, it is most often known as T-Carrier [T-1]. Outside North America, narrowband, known as E-1, has an upper limit of 2.0 Mbps, not 1.54 Mbps. Services that deliver at speeds between T-1 and T-3 (45 Mbps) are generally called wideband or broadband services. Multiplexers and concentrators allow more devices to share a single line. This permits many slow-speed devices to send data concurrently over a single circuit. Data concentrators use buffering circuits to make maximum use of high volume lines with slow-speed terminals. Multiplexers allow data from several sources to be transmitted over one line.

1.2.4. Provisioning

The technology for information communication resides in the provisioning and in the equipment. Provisioning refers to the part of system external to the user, namely, all the elements involved in how you connect with others globally. Equipment refers to the hardware that one uses to make the connections. The simplest instance of digital convergence is the computer telephony. Basically, it is an end-to-end digital technology that allows regular voice calls and the transmission and reception of messages through Internet-video, Internet-fax, and e-mail. The core of the problem with access lies in provisioning.

1.3 What has happened in ICTs generically?

A new age has dawned where goods are paid for, delivered and used without leaving the information systems and communications networks where they were created. In a networked economy, the investment capital is knowledge and the means of production is the human intellect (ITU, 1999, p.1). The 1990s so far, are seen as the era of the greatest policy reform in communications technology that the world has ever witnessed. National carriers were privatized, new competitors and services authorized and old orders jettisoned by the pace of technological change (augmented in no small measure by the positive winds of good governance).

1.3.1. *Legislative and regulatory regimes*

Advances in ICTs, particularly the Internet, have introduced new challenges in the regulatory and legislative regimes and have begun to blur, if not erode, the traditional definitions and jurisdictional boundaries. Since the beginning of the 1990s, more than 150 countries have, in some form, modified their existing regulatory regime on ICT. Unique among those changes is Malaysia's 1998 Communications and Multimedia Act. The Act consolidates telecommunications, broadcasting and computing into one industry with one regulator. Pressures for convergence in regulation is from the increasing overlap of telecommunication regulation with content or broadcasting regulation. These pressures are expected to increase only as telephone and cable operators cross-enter product lines previously delimited, and as the delivery capability of the Internet improves depending on governance and prospects for the deployment of broad band. This issue also depends on the articulation between competition and the regulation of incentive.

To know what is happening in ICTs, beyond raw computing power and higher throughput, one must first understand the trends in all aspects of telecommunications and the evolution in wireless communications (or in transmission media generally). Although new technologies and services are evolving faster than the bodies that regulate them (regulations traditionally occur with a lag), one of the most noticeable trends in telecommunications has been the proliferation of new legislation and regulatory authorities. According to the International Telecommunication Union (ITU) (1999a), there were only 10 independent telecommunications regulators in Africa at the beginning of 1990s, but by August 1999, the numbers had increased to 84. Additionally, existing regulators have become more powerful and acquired more resources from governments that recognize the positive role of communications industries in the welfare of their citizens.

1.3.2. *Ownership and market structure*

Approximately 25 percent of African countries, between 1989 and 1997, partially altered the ownership structure of their ICT sector although the drive to restructure gathered momentum only in the second half of the 1990s. During this period, 62 percent of the 42 ITU member states in Africa unbundled posts from telecommunications, while close to 75 percent turned telecommunications

operations into state corporations. Little or no privatization has occurred in broadcasting. The trend in liberalizing this segment of the market has been to allow *de novo* entry.

Reforms vary widely across regions, and even within the same regions:

- Senegal has introduced a second cellular network provider
- Ghana and Uganda both have licensed second fixed landline local exchange network carriers
- Madagascar and the Democratic Republic of Congo (DRC) have moved from duopoly to full competition
- Kenya and Nigeria have advanced in cellular communications competition
- South Africa is still wobbling in her overall ICT policy
- Niger and Chad have private participation in the long distance segment of their telephony
- at the other extreme end of inertia are countries like Congo, Eritrea and Somalia who, by mid 1999, had no local Internet access (see table 1).

Nonetheless, ITU (2001) characterizes the new millennium as remarkable because for the first time in more than 100 years, the number of incumbent carriers with private capital participation has tilted the balance in favor of private equity. Americas lead the world with nearly 75 percent of countries in that region having privatized their network infrastructure, followed by Europe with 63 percent, Asia-Pacific with 53 percent, Africa with 35 percent and Arab States with 29 percent. Many countries, including the USA, continue to restrict the origin of capital and the amount of equity or control that foreigners may have in the service providers, particularly broadcasting.

Despite the overall increase in competition that has emerged with changes in the regulatory climate and ownership structure, much is yet to be achieved. Approximately 60 percent of all countries still prohibit competition in basic services: local, trunk, international or leased line markets. However, this lack of competition has not spelled easy life for network carriers and other incumbent operators. Potential and actual threats from new technologies and services that can bypass existing local networks and regulatory restrictions signal competition and difficulties for governments that attempt to lean against a free market². An example is the pressure from mobile services.

1.3.3. Cellular communications and Internet-based services

Unfortunately, the relatively high degree of competition (compared to the fixed line), diverse ownership, and innovation in mobile markets are dampened by the high cost of spectrum auctions to the industry. This new generation of spectrum-hungry mobile services is expected to broaden the access by end users to mobile data applications. Like the mobile telephone services, Internet access

²See ITU (2001, p.5) for a recount of some of the ways in which technological innovation has broken down barriers to competition by lowering the cost of regulatory avoidance, and in so doing allowed regulatees to punish (impose revenue losses) regulatory regimes that "lean against the wind of change."

grew principally outside the core business of incumbent carriers, providing fertile ground for the rise of new service providers and the opening of markets to competition. Except for government intervention to prohibit incumbent carriers and their subsidiaries from entering Internet services, the market is dominated by ISPs that are controlled by incumbent operators.

Ranked next to mobile services in competitiveness are lease line markets. Unfortunately, prices in this segment have remained high despite the declining cost of supplying transmission capacity. Lease lines are the building blocks of e-commerce and other Internet protocol (IP)-related services. The cost of international lease lines has been a source of considerable concern to low-income countries. The problem is the Internet sharing costs among members of the international telecom and Internet community. ISPs outside the United States have to pay the full cost of international lease lines to US Internet backbone providers. These costs increase for ISPs located in countries that are far, geographically, from the main Internet backbone providers. This means that many low-income countries have to bear higher costs than ISPs located in the United States or in countries that are closer to the main Internet backbones. This asymmetry already holds far-reaching implications for worldwide competitiveness in the growing e-commerce and other information-based products.

1.3.4. Mobile technology and transmission media

Other notable trends in ICTs are in mobile technology, mobile computing equipment and wireless transmission media. All these trends have implications for mobile commerce [m-commerce]. Advances in mobile technology are turning cell phones from devices for simple voice communication into powerful mobile computers, permanently connected to the Internet.

Wireless application protocol (WAP) and high-speed data transfer drive the trend. The initial arrival of WAP was dampened by the slow rates of data transfer over existing networks making it difficult to achieve anything on the Internet from a cell phone. This is now set to change with high speed data transfer through general packet radio services (GPRS), a cellular network technology that boosts data transfer speeds to at least that of fixed telephone lines. It also has bluetooth that replaces infra red with powerful wireless connecting devices like printers, computers and cell phones.

1.3.5 Numbering and addressing

Numbering and addressing are now important aspects of communications technology. Names and addresses are not only markers that guide the movement of information from source to destination in a networked economy and an information-saturated environment (informatics jungle) but they have also become public identifiers with important implications for marketing, visibility (branding) and ease of use. Some e-commerce vendors, for instance, offer discounts on their products to customers residing in certain parts of the world. Vendors can automatically establish residency by detecting IP addresses and the physical (registered) location when e-mail requests for preferential treatment arrive. The National Bureau of Economic Research (NBER) in Cambridge, Massachusetts currently

offers this facility to students, academics and researchers in some developing countries, including Africa.

The evolution of numbering and addressing are driven by three major trends:

- the proliferation of new communication devices such as facsimile, pagers, satellite phones and mobile phones
- the increase in new services, such as free telephone calls (toll-free '800' numbers), international premium rate, and shared cost services, all demanding separate numbering domains and for some, international or global coordination of numbering
- the liberalization in the telecommunications sector that require the allocation of numbers to competing service providers, the addition of carrier access codes to numbering plans, and the ability to transfer numbers across service providers. In Internet domain name registration, ITU estimates the number of domain names presently registered at over 8.5 million, but this is expected to increase to 28 million by 2002.

1.4 What has happened in the governance of ICTs?

1.4.1. Licensing

Diversity in licensing regimes is important in the age of globalization and digital convergence. It has been argued that "asymmetrical licensing regimes may impede growth and make the implementation of global services and transition to new generation regulatory frameworks that will be required for the age of cybernetworks more complex (ITU, 1999 for instance). The diversity in the regimes reflects the diversity in views from one country to another on the role and goals of licensing. There is also an element of path-dependency because the liberalization program in each country depends, to a large extent, on the existing political and industry structure. Despite this diversity, there are noticeable trends, for example, in the themes underlying individual country licensing regimes. These include:

- ensuring universal service obligations or the availability of public service
- promoting the expansion of network infrastructure
- deploying optimal technology
- maintaining installed capacity
- ensuring sustainable competition in the market for IT and related services

1.4.2 Universal Service Obligations [USO]

The governance trend in universal access is singled out because it is highly controversial and is believed to be one of the few areas that will always be present and controlled by the government to achieve the desired objective because of market failure. This will continue even after competition has spread across market boundaries. Many new policies geared towards improving universal communication services share a new emphasis on the importance of public access points for broadening access to the array of communications technology that has been installed. Some regu-

lators require licensees to provide a certain number or proportion of public access points before issuing licenses. Others pursue more complex incentive schemes that include some or all features of a multimedia telecentre.

In contradistinction, some regulators, convinced of the virtues of open markets are introducing some elements of competition to fulfil universal access goals. For instance, competitive tendering for the provision of payphones to unserved villages has been used in Chile for some years and in Peru since 1998. In Chile, a specially constituted council examines applications and awards each tender to the best bidder. Initially, this was the bidder that required the lowest subsidy, but now other factors, such as rollout speed are considered. The Ministry for Communications in Australia is also thinking of developing a process that will subject the Universal Service Obligation (USO) to competitive tender.

There is also the interfacing of technology and regulation in conditioning progress to meet USO, for example, the role of peripherals and intelligent networks, in conjunction with sophisticated voice technology that are offering new opportunities—broadening the range of custom services available—or extending communications access and use. The celebrated case of these new opportunities perhaps is virtual telephony that is now quite widespread among homeless people in the United States and is also being sold successfully in other countries like Botswana and Chile. Virtual telephony provides the subscriber with a telephone number and a voice mailbox, enabling the customer to receive messages and access them from any telephone. An upgraded yet economical service radio pages the subscriber when new messages arrive. This is identical to the mail notification option that has virtually become standard on most e-mail applications and is offered as “instant messenger” on Hotmail, Yahoo, AOL and Netscape at no additional expense.

1.4.3. Interconnection

Interconnection is at the heart of competition and convergence and it is another area where differences in governance exist. In the long run, it will allow individuals to access networks and services of their choice. National authorities have chosen one or a combination of approaches to different interconnection issues but most give precedence to the “will theory of contract.” Following are some approaches to the issue:

- leave it entirely to commercial negotiation between parties, but if parties reach a deadlock, they may appeal to competition and antitrust law
- leave the issue entirely to commercial negotiation between parties, but subject to regulatory intervention if parties deadlock
- leave the issue entirely to commercial negotiation between the parties, but the regulatory authority sets the framework for negotiations and approves the agreement, or intervene if they reach a deadlock
- allow regulatory authorities to prescribe specific issues from the outset and parties to negotiate over the remaining issues

New Zealand and some countries in the Asia-Pacific region, and most countries in Africa follow (a) and (b) that rely on market forces. Europe and the Americas have relied on options (c) and (d).

1.4.4. Pricing of services on digital networks

Prices are central to the development of products and services. Efficient pricing in networked industries are particularly important because of network externalities, lock-in effect and other peculiar characteristics. Network externalities means that the effect of using the good extends beyond the benefits to the parties involved in the transaction. Therefore, the price of (reflecting private or individual valuation) such a product may not reflect the social value. Consequently, too little may be produced or demanded relative to what would be ideal in that society. Lock-in effect signals switching of costs whereby customers subscribing to a service may incur a non trivial expense to transfer to another supplier due to system incompatibility, high set up costs, or other implicit costs, for example, when a telephone number cannot be transferred across providers or when e-mail addresses have to change. *Ex ante*, the customer may face competition yet *ex post* he/she could become a captive customer to a *de facto* monopolist. The dynamics of competition in the industry, such as in product development, may also be unbalanced because the "winner keeps all." In such a contest, where a competitive outcome is not guaranteed, governing the price profile in the market becomes important. So far, the most common standards for judging the overall fairness of the prices and profits of an incumbent network operator are return on investment and improved productivity.

1.4.5. Numbering in the digital era

The IT community cites domain names as the focal point of change in Internet governance. The problem of adding new top-level domains [TLDs] to the root of the Internet that appeared simple has set sweeping global changes in Internet administration in motion. The staggering growth of the Internet has increased unresolved issues including the following:

- who has the right to add TLD names?
- how many TLDs should be served?
- how should conflicts between domain name registrations and trademark rights be resolved?

These and others matters raised in the following section need to be resolved to promote innovation while preserving rights of individuals and entities.

2. Key Issues for Decision-makers

2.1. IP Telephony

The popular trend of making and receiving telephone calls through the Internet and other networks based on Internet protocol (IP) is a pressing policy issue. Customers can access IP telephony at much lower costs than those of conventional circuit-switched networks, particularly on long-distance and international calls. This is partially because traffic pricing on IP-based networks does not depend on distance. Many operators, worldwide, have announced intentions of eventually moving all their global traffic to IP-based networks.

While IP telephony offers cheaper calls for consumers, the economics is much more complex for carriers because their revenue and technologies may be affected adversely if customers move to other services or companies. There is also the risk of technological obsolescence and its implications on profitability and recovery pricing. Technological obsolescence will inevitably occur, as IP-based networks increasingly become the technology of choice in the deployment of new network-infrastructures. For developing countries, IP telephony presents an additional dilemma because while it promises to reduce the cost of international telephone calls, it may also reduce revenues from calls that are currently helping in funding the extension of the domestic network and also in meeting universal service obligations.

Governance of IP telephony has taken different forms. Some countries prohibit it, some license it, and some pay no attention to it. Most countries, however, have not yet taken a stand. The research issues to consider are to:

- emphasize the potential conflict between existing regimes and technological change—the serious implications of technological obsolescence and the need for governments to recognize these implications in policy frameworks
- recognize that while IP-based networks can improve the odds of under-served communities in joining the information society, several conditions are prerequisite for a successful transition to IP-based networks

What are these underlying policy, regulatory and technical issues, and is there a consensus on them?

2.2. Equity and Access

It is known that the (digital) technological revolution is yet to overcome the wide gap between information “haves” and information “have-nots.” This digital divide “is simply an extension of the same problem policy makers have traditionally confronted over the decades in attempting to foster universal access and network development” (ITU, 2001, p.1). Reforms in the ICT sector have helped to improve shortcomings in universal access to basic services between developed and developing countries. Nonetheless, the situation has worsened in some countries because of various factors including governance. This gap is most evident in the Internet sector. In 1999, the penetration rate of Internet use was 20:1 between developed and developing countries. Between 1995 and 1999, low-income nations increased their share of all Internet computer hosts by a mere 1 percent (ITU, 2001, *ibidem*).

2.2.1 An example from the CATV industry

You walk into a hotel room, flip the remote control, and the TV comes alive. The display on the screen says, “Hello, Dr. Jane. Welcome to our hotel. We aim to please but if we have forgotten anything, please enter ‘Gripe’ on the remote and press the enter key.” Welcome to the world of ICT where the impact of the Internet has been felt most acutely by the cable television [CATV] industry. It is said to have “revolutionized not only traditional telecommunication markets, but also broadcasting and its associated fields.” The advent of cable modems has turned the CATV systems that provided only one-way broadcasting in the past, into potentially powerful platforms for Internet access, and into interactive systems. But the presence of CATV services around the world is uneven. Of the 249 million subscribers globally in 1998, 38 percent were in Asia, 35 percent in the Americas, 26 percent in Europe and virtually none in Africa. As cited in ITU (2001, p.12), the actual percentage of the world total subscription attributed to Africa is 0.003 percent. If this communication medium proves critical to universal access and servicing, Africa would have been left behind even before the event begins. Africa would be unable to benefit from the affordability that comes with the economies of scope from cable modem opportunities: the ability to integrate Internet access, voice service, and video delivery into a package deliverable through the same medium to the home or business.

On governance, most countries have demurred on considering extensive changes in competition structure that would address the growing pressure for regulators to impose interconnection and unbundling obligations on cable television operators, and on other alternative network operators in the same way they have done to incumbent telephone companies.

The questions are:

- Whether or not to extend, and how to extend to alternative network operators regulations that hitherto were not meant for them?
- What legal and policy approach should be adopted regarding high speed Internet services delivered over various platforms including cable television, wireless, satellite, broadcast and

un-licensed spectrum technologies, bearing in mind the goal of poverty reduction and of bridging the digital divide?

- Similarly, should “open access” (cross-entry) to CATV systems and other high-speed networks operated by ISPs be allowed?
- What government agency or agencies should resolve these issues and which one of them has the capability to do so?
- In the case of multiple agencies, what happens when there are jurisdictional conflicts or overlaps that hamper rather than promote the goals?

2.3. Legislative and Regulatory

Inappropriate interconnection requirements can act as a barrier to competitive entry to the industry, undermine investment in new infrastructures and deprive the public of innovative and attractive (affordable) service options. Various regulatory fora worldwide confirm that regulators consider interconnection to be the single most important issue in the development of a competitive marketplace for IT related services. However, a sound interconnection framework is no easy task, especially since many regulators must do so when their agencies are still at the formative stages. Besides, the rapid pace of technological changes and the challenges that come with it are formidable for even the most solidly established and experienced authorities.

While the traditional emphasis has been on the need for dominant incumbent network operators to interconnect with other service providers, there is growing recognition that the ultimate goal is “any-to-any” interconnection. That is, the ability of any network operator to establish connectivity with any other operator. As first highlighted in the case of CATV, policy makers are facing pressures to consider broadening the application of mandatory interconnection rules to a wider range of network operators. Some have chosen to pursue a technology-neutral approach, moving towards any-to-any interconnection. Others believe that more widespread interconnection obligations would benefit more end users. Yet others maintain that market forces will be adequate in promoting any-to-any interconnection without imposing specific interconnection obligations on every service supplier. The latter argument is forceful when regulatory and administrative capacities are scarce. However, most policy makers agree on the principle that any network operator who achieves a dominant position that can be used to stifle competition should be subject to specific interconnection obligations. Meanwhile, the burning policy question is still how to identify the optimal interconnection approach for each market?

Efficient interconnectivity to the fullest extent—voice, data, video and multimedia services—requires that a variety of arrangements are put in place. These arrangements include the interconnection of signaling networks and access to operations support systems and call-related databases including some portability databases. And for the arrangement to be sustainable, the pricing of interconnection must be financially viable for all parties.

The Annual ITU Regulatory Survey reveals that by 2000, at least 101 countries had established interconnection regulatory frameworks of some form, relying on a host of measures including legislation, license provisions, executive orders, directives, guidelines and determinations. As governments and regional organizations work to set the ground rules for interconnection, they inevitably confront vexing and complex issues involving the basic legislative and regulatory frameworks that must be installed and enforced, and also the technical scope and characteristics of interconnection arrangements. Accordingly, policy makers must resolve basic questions, such as:

- which carriers are required to offer interconnection?
- how will the costs be calculated and recovered?
- at what points in the network should interconnection occur?

A closely related issue also arises about network unbundling or the mitigation of incumbency advantages. These incumbency advantages derive from a massive head start in the market, acquired by existing network operators who for decades operated as monopolies, with huge investments that entrants find difficult to copy within a short time frame. Unbundling or unpacking allows a competitor to use parts of an incumbent's network or purchase network elements on a need-to-use basis.

Many policy experts oppose widespread unbundling mandates because of the concern that it may undercut incentives to build alternative networks. Nonetheless, once policy makers decide to unbundle, they must also decide on the extent of the exercise but there are technical limitations. Access to facilities (local loops or switches) to back office functions (operations support systems) can be unbundled much the same like access to databases and software used to provide network services but there are other elements that are not easily separated.

Therefore, central to all efforts at unbundling is the need to permit competitors to collocate their equipment with the incumbent's network facilities to take advantage of stratified network elements that cannot be unbundled. The regulatory issues are onerous, involving not only the technical details in interconnecting network facilities but also issues on the incumbents' property rights. Authorities must balance the need to provide competitors with meaningful unbundling opportunities with the incumbents' rights to use their property to maximize network operations and efficiency. This is often a delicate balance to achieve, given the incentive for incumbents to delay and complicate collocation arrangements under the pretext of protecting their property and network operations.

Overall, the regulatory and legislative issues arising from these policy concerns include:

- How far, and at what point a regulator should intervene in industry negotiations over interconnection?
- Whether to establish binding rules or regulatory guidelines, and under what framework?

An *ex ante* framework involves setting, in advance, clear and detailed sector-specific rules for all market players. An *ex post* model, by contrast, gives market players substantial freedom and flexibility with intervention only after regulatory infringement has occurred.

2.4. Institutions of Governance

Once a government determines the basic parameters of a regulatory framework, it must then decide how it wants to govern, i.e., develop the institutional structure. Issues that the government needs to consider include:

- what would be the optimal regulatory structure?
- what should be done to the existing or inherited framework?
- will it be a single integrated agency or a multiple agency to govern each of the components of digital technology?
- will the agency be organized around functional lines or along some other organizational model?
- will the regulatory authority or agencies, once created, be independent of the dominant players (i.e., questions of regulatory capture)?
- will the agency or agencies be “independent” from political power?
- to whom is the agency or the agencies accountable?
- from what source will the financing of the authority or agencies come?
- how independent is “independence?”³
- what would be the governing structure of the agency or agencies and will it vary according to the model of organization chosen for each agency?
- will the body be collegial, governed by a director-general, a board, or other governance structure?
- what would be the optimal decision-making (management) style—active involvement, participatory/consultative, transparent, flexible, extensive, and accessible?

Other institutions that may be important include arbitration establishments operating within strict time bounds to avoid unnecessary delays, but with recourse for the aggrieved parties to appellate bodies. Time is of essence to avoid dilatory tactics that could delay competition. Other parallel questions implicated include but are not limited to who decides which governmental body is empowered to pass regulations, to adjudicate, to make policies and to enforce them? In some countries, these may already be enshrined in the constitution. In others, they may represent matters of the moment requiring careful attention and resolution.

³Even the Federal Reserve Bank of the United States is only independent within the government. It is still required by law to account to Congress (the National Assembly) for its activities, and do report to that body periodically.

3. The Research Agenda

Given the almost universal appreciation and acceptance of the benefits of efficient ICTs in contemporary society, it is puzzling that the pace of ICT dissemination in Africa has not reflected this ostensibly huge expected social benefits. Many argue that policy and regulatory environment affect effective dissemination either because there is no coherence or internal consistency in the policy. In some sectors policies are missing.

In recognition of the centrality of telecommunications to ICTs, some attention will be devoted to case studies and the thematic papers to reform processes in telecommunication industry: the political economy of the reform (power and distributional issues) and how parallel developments in other sectors of ICTs influence the reform process in telecom? The rest of the study concentrates on ICTs as a process embodying much "learning-by-doing" by all participants (the innovators and the regulators alike), typical of evolutionary processes.

The emphasis is on governments reviewing issues raised by the following questions:

- is there an enabling environment for the effective promotion of ICTs?
- what aspects of convergence are critical for the promotion of equity, access, and the reduction of the "digital divide?"
- how should the process be managed to compress the time frame required to achieve a reasonable convergence?
- how should the governance proceed; should the convergence of services require adaptation in the regulatory framework?
- should a composite regulator handle broadcasting and CATV, telecom, distribution and sales and software-content issues?
- are the legal principles and issues deserving of separate regulators because of the differences in telecom law, broadcasting law, intellectual property law and commercial law?
- are some of the current initiatives, often pursued without government support, sustainable in the long term?
- how can we use ICTs to improve political participation and equitable access to justice?

African legislative regimes lag behind the developments of ICTs in trade (e-commerce) and in new financial instruments that are ICT based. For Africa to compete globally, we have to review and update these laws and create or reform our institutions to take account of the growth in ICTs.

3.1. The Research Problems

A chicken in every pot. An egg in every basket. A loaf of bread on every table. At the dawn of the new millennium, the nations of the world are more interconnected than at any other time in human history. We can communicate and exchange information in ways and at speeds that would astound generations past. "Indeed, in this age, the challenge for the world's technologically blessed is to fully comprehend and utilize the power of communications technologies that are just a mouse click away (ITU, 2001, p.109).

Unfortunately, for many in Africa "the chicken, the egg and the loaf of bread are still pies in the sky." For every globally roaming mobile end user, there are scores of individuals who cannot call a doctor in the event of an emergency or who have no doctors to call. For every "distance learning" student in the global village, there is an overwhelming majority in Africa who are without any kind of "connection." Therefore, the challenges facing policy makers and regulators alike are:

- how to provide an enabling environment for ICTs in Africa that will extend networks to the overwhelming majority of their constituencies who currently cannot enjoy them
- how to maximize the existing information communication technologies and promote its evolution

These are questions that implicate the governance mechanisms at work in the respective African countries, the objective of this research.

3.1.1. Problem 1

What are the appropriate governance mechanisms to provide enabling environments for ICTs to thrive in Africa?

a. Nature of Governance [Policy Legislation]

The nature of governance raises the following questions:

- what are the advantages and disadvantages of the two major types of legislative frameworks?
- what roles do the state of competition in the ICT sector play in the choice of legislative regimes?
- are bargaining powers sufficiently balanced between the ICT players to warrant serious consideration of an *ex post* legislation model in any African country?
- what are the current legislative issues in multimedia law, broadcasting law, telecommunications law, electronic transaction law, wireless law and licensing laws (including frequency spectrum allocations), competition/ enterprise restructuring and interconnection law?

- what is the appropriate order in which these issues should be tackled (optimal sequencing issues)?
- what is the best combination of interconnection rules and regulations (taking account of country peculiarities) that will extend connectivity to residents and businesses in a service area to maximize the value of existing networks, draw on the enhanced value and extend access to areas that were not served within a national boundary?

On clarifying and allocating content liability in multimedia, what is the appropriate policy interface between national norms and Internet standards? For instance, to specify whether a carrier should be responsible for content or to hold the provider accountable, with social responsibility resting on all parties to report illegal contents, such as:

- intellectual property issues, privacy and compliance with cultural restrictions such as advertising limits, racial slurs, "hate groups," economic liability for lost or damaged information
- internet crime, such as child pornography, hacking, national security issues, harassment and right to privacy
- freedom of African nations set their own standards or conform to global trends
- awareness of African nations of the fora and processes that facilitate the decisions on standards

b. Requisite Institutions of Governance [Regulatory Institutions]

Following are questions on the requisite institutions of governance?

- how can countries install effective regulatory institutions—structure, function, financing, career trajectories, incentives, research and training (professional development) and enforcement mechanisms?
- what are the regulatory and legislative capacities in individual countries on information gathering (pricing, tariffs, cost data, analysis and financial information) needed to formulate sensible policies?
- policies that strike a balance between the demand on regulators in a globalized environment: Demand transmitted by trading partners through the World Trade Organization (WTO) framework (it's reference paper on regulatory principles), and those that originate locally, reflecting national realities, in the form of existing legal, administrative, and political conditions and institutions
- how can the existing legislative and regulatory milieu be changed to accommodate the above requirements, in particular, the model bill and policy adopted by the 14 member countries of the Southern Africa Development Community (SADC) that aims at building a regional info-communications industry that is competitive, and creates an enabling environment?
- even though the document does not address content, can it serve as a springboard for other African countries?

3.1.2. Problem II [The Regulatory Process]

How can we maximize the benefits of existing ICTs, and promote its growth and development—the search for an optimal regulation?

a. Encouraging Competition [Protecting the Process]

While recognizing the dynamic nature of the sector, the complex issue of the separation of content and transport regulation should be examined and peculiar “coordination failures” that warrant exception to the rule determined.

The issue to address is how competition (mechanisms) should proceed in the various segments, such as basic services, long distance, cellular services, lease lines, Internet and value-added services, cable television, and multimedia—consistent with the following:

- promoting the development of IT capabilities
- promoting the growth of robust applications environment for end users consistent with trade related intellectual property rights [TRIPS]
- encouraging democracy (civil society) on the basis of IT-based services
- identifying anti-competitive concerns, such as price, cross-subsidies, interconnection, unbundling, and market dominance
- identifying the inherent tensions between achieving USO and nurturing a competitive market and a dynamic ICT sector

b. Encouraging Innovation/ Investment Incentives [Regulatory Contract and the Long-run]

Encouraging innovation and investment should be consistent with the following:

- recognize the types of positive regulatory actions (standards, coordination, transparency, competition, and exclusivity) that can promote efficient investment in modern technology in general, and in premium African-content in particular.
- recognize that the means used to assign public resources can be an instrument that has implications for efficient use and can also exclude valued market participants and discourage investment and innovation. A licensing *regime* should be reviewed, to verify that it is not generating unintended negative consequences. Since licenses for various operations and services may be “categorized, targeted, limited, expanded, conditioned, burdened, taxed or withheld in a variety of ways to achieve a desired goal”, there is a need to review the existing or missing licensing schemes to identify service and facility categories. The selection and application of various means of authorization—whether individual licenses, class licenses, concession contracts, permits, registrations, the determination of spectrum allocation, as signment mechanisms, or public rights-of-way (imminent-domain) should also be acknowledged. Additionally, establishment of licensee qualification standards (where they exist), and the license application procedures should also be reviewed.

Recognize that there are multiple and evolving innovative ways of establishing access, studying the performance of "telecentres" and considering their targeted support (through policy instruments) to bridge the "divide." An example is promoting voice services through multimedia delivery, with IP telephony a seemingly affordable option in the multimedia pack⁴.

⁴The technology is already here; the issue is that of the appropriate policy intervention, as well as the economics. With the installation of a Web-cam on the end users= terminals, Yahoo subscribers, for instance, can now video, audio, and text-message, functions all of which are accessible from the Tools menu.

4. Research Methodology

4.1. Research framework

The proposed research strategy recognizes that ICT issues are cross cutting and inherently multi-disciplinary in nature, drawing from philosophy and law, IT, economics, business, management, politics, organizational sociology, among others. Therefore, a workshop on methodology is envisaged where the network of researchers will determine the appropriate multi-disciplinary balance for country case studies and analysis. Nonetheless, each case study will survey, document, analyze and signal policy implications and/or recommendations as appropriate.

4.2. Data sources

Data will be derived from the following sources:

- governments
- field interviews
- United Nations Educational, Scientific, and Cultural organization (UNESCO) Observatory
- African Development Forum (ADF) of the United Nations Economic Commission for Africa (UNECA) on the information society.

The ADF initiative provides a selection of documents and related web sites on governmental action plans, policies and strategies on the development of information society, and on the evolution of privacy and confidentiality, content regulation, multilingualism and access topic domain information.

Internet sources will include:

- the Central Intelligence Agency (CIA)
- the World Bank,
- ITU (rural development and universal access)
- Acacia Initiative
- African Information Society Initiative (AIS)
- African Internet Connectivity (AIC)
- Internet Resources Directory
- L'Afrique sur l'Internet
- Economic Internet Toolkit for African Policy Makers

- InfoDev
- SADC in the next millennium
- Rural Telephony in sub-Saharan Africa

4.3. Thematic papers

Thematic papers that focus on technical, conceptual and analytical issues will compliment the studies. The papers will inform policy making and stimulate debates and further research at fundamental and applied levels. There are two obvious technical topics that deserve such analysis although the workshop could generate additional paper(s). One paper will be on *Efficient Regulatory Institutions*, addressing the determinants of strong national regulatory institutions and legislative policies. The analytical framework will rely on a combination of public administration, distributive politics and institutional economics. It will also emphasize that credible regulation and enforcement represent the transformation of the political game in an effort to enhance the political security of the incumbent regime. It will also stress that such acquisition and retention of power, as an end in itself, complicates the attainment of an enabling environment for the development of ICTs (which actually is not an end for those with the decision making mandate).

The other thematic paper will focus on tensions between universal service obligations and the prospects for the growth and development of the "connected society" in Africa. It will address the articulation of public policy and private investment in local networks, backbone networks and in the Deployment of Advanced Infrastructure. The analysis will draw on the on going policy legislation debates that discuss how policies designed to promote competition, investment, and universal access may conflict with each other. According to the debates, the tensions are not in the conflicting objectives but they emanate from specific policies that are implemented in pursuit of these objectives: a case of "good intentions and unintended evils." Proponents of this viewpoint to regulatory contracts, standard costs, incumbency disadvantage, and recovery pricing that are the very anti thesis of the issues we have been grappling with so far. We expect to be challenged, excited, and even shocked by the analysis on this critical issue.

5. Organizational Outline

5.1 Activities

- three research workshops: methodological, progress and final
- policy roundtables in selected countries, with the following groups:
 - legislative portfolio committees on ICTs
 - technocrats in the relevant ministries and regulatory agencies
 - operators in the industry including service providers and consumer advocacy groups
- dissemination workshop involving the civil society and the media

Given the centrality of “connectedness” /USO to the whole exercise, we suggest a menu of countries based on Internet density, Public Access ISPs, call cost (affordability), and teledensity but the final choices will depend on logistics and budget constraint [see table 1].

5.2 Potential Outcomes

- governance capacity building: A proactive input into the legislative process and institution building (interventions through policy roundtables are of essence here).
- augmenting the knowledge base on the evolution of ICT policy in Africa: concrete outputs include virtual publications on ATPS website, and real publications of:
 - thematic papers
 - UNESCO Observatory se studies
 - synthesis in the form of a policy brief
 - synthesis in the form of a technical brief
- lessons from the study countries will benefit other countries in similar circumstances.

Table 1: Potential Study Countries from Sub Saharan Economies

Country	Public Access ISP	call cost (\$/hr)	Internet density	Teledensity
Botswana	3	0.60	1551	5-10
Burundi	1	0.75	43927	na
DRC	1	na	98416	na
Kenya	10	1.36	1935	na
Nigeria	12	0.40	40591	na
South Africa	70	1.60	177	10-20
Tanzania	10	1.94	10730	less than 1
Uganda	3	8.40	1777	less than 1

Notes: Source:- ITU (2001, 1999). Internet density is the ratio of population per user. Teledensity is telephone lines per 100 inhabitants. These are quick guides to distance from the Information Age or connectedness. DRC is the Democratic Republic of Congo. Data for Teledensity as at January 2000. "na" means current data not available.

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For more information this series and ATPS Contact:

The Executive Director
The African Technology Policy Studies Network
3rd Floor, The Chancery, Valley Road
P.O. Box 10081 00100 General Post Office
Nairobi, Kenya

Tel: +254-2-2714168/092/498

Fax: +254-2-2714028

Email: info@atpsnet.org

Website: <http://www.atpsnet.org>