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**Financing Mechanisms
for Information and Communication
Technologies for Development**



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Notes

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1. Introduction

The Geneva phase of the World Summit on Information Society (WSIS), which took place in 2003, recommended that “while all existing financial mechanisms should be fully exploited to make available the potential benefits of information and communication technologies, a thorough review of their adequacy in meeting the challenges of ICT [information and communication technology] for development should be completed by the end of December 2004. This review shall be conducted by a Task Force under the auspices of the Secretary-General of the United Nations and submitted for consideration to the second phase of this summit.” In response to this, the Secretary-General asked the United Nations Development Programme to take the lead in setting up a Task Force on Financial Mechanisms (TFFM), in collaboration with the World Bank and the United Nations Department of Economic and Social Affairs and other key partners.

The Task Force in 2004 released a 120-page report which contained a thorough review of all existing financial mechanisms available then and identified major gaps and challenges which called for concerted action. This report was forwarded for consideration by the Prepcom of the second phase of WSIS, which took place in Tunis in 2005. One of the main outcomes of the Tunis phase was the “Tunis Agenda for the Information Society”, which contains a section on “Financial mechanisms for meeting the challenges of ICT for development”. The Tunis Agenda draws on the work of the Task Force, and identifies a number of areas as in need of greater financial resources, and where the existing approaches to ICT for development (ICT4D) financing had been inadequate. The Tunis Agenda also outlines a number of recommendations that aim at “improvements and innovations in existing financing mechanisms”, directed at national governments, multilateral, regional and bilateral development organizations.

The Commission on Science and Technology for Development (CSTD) has been requested by the Economic and Social Council to assist it in the follow-up to WSIS. In this context, the Commission at its twelfth session decided to examine “Improvements and innovations in existing financial mechanisms” during its 2009–2010 intersessional period. This paper was prepared based upon review of the findings and recommendations of the TFFM Report and the Tunis Agenda, and of developments in the years since the conclusion of the World Summit. It presents observations and trends that have occurred in the key areas identified by the TFFM and Tunis Agenda, in terms of development of ICT opportunities and financing, and then identifies key challenges and opportunities going forward, for addressing continuing gaps and new conditions in ICT development policy and financing.

2. Policy frameworks and implementation strategies

2.1. Issue summary and background

The issue of financing for ICT development does not stand in isolation, but must be considered within the overall framework of national ICT policies, and indeed national development and poverty-reduction policies in general, as information and communication have become increasingly central to effective, sustainable economic growth throughout the world. The TFFM Report strongly encouraged the establishment of ICT policy frameworks that encourage and enable competitive investment opportunities and open markets for these technologies and services:

“removing barriers to market entry and resource mobilization can, by themselves, unleash major flows of untapped financing”.

The report went on to describe some of the many examples of innovation and growth that have occurred in unconstrained ICT markets, from mobile telephony and SMS text to the Internet itself. To reinforce and sustain the impacts of such fundamental market forces, government policies must establish strong and effective regulatory mechanisms, which can guide the transition toward lasting and expanding competition. As identified in the report, the key regulatory imperatives necessary to promote market-based development include:

- Licensing procedures;
- Competition regulation;
- Interconnection regulation; and
- Reducing costs and risks.

Throughout the past two decades, the overwhelming majority of countries has embraced, to one degree or another, the benefits of liberalized telecommunications markets and has followed the path of opening markets and establishing regulatory agencies aimed at managing and promoting competition. As of 2005, however, a large number of developing countries were still struggling to fulfill these goals. The challenges associated with market liberalization include not only the basic steps of modifying legislation and issuing new licenses, but the more complex demands of developing regulations that fairly and effectively implement each of the key requirements identified above. Perhaps most difficult, especially at the outset of such policy reforms, is for newly-established regulatory authorities to obtain the expertise and skilled personnel, as well as other resources, essential to oversee a newly created competitive market. This is especially challenging when, as has most often been the case, the introduction of new, competitive operator licenses takes place before all of the critical elements of the competitive regulatory regime have been set up.

At the same time, the rapidly changing dynamics of the ICT sector and its role in national economies and poverty reduction strategies has mandated that ICT policies be linked and integrated with a range of other Government initiatives. Many countries have brought ICT objectives to the highest levels of public priorities, establishing new national ICT policy statements, “e-strategies” and high-level agencies empowered to promote the ICT development agenda across multiple sectors of public and private activity. This is new territory for most of these governments, which are also seeking to implement their own internal ICT related resources and “e-government” initiatives. For these reasons, the TFFM and the WSIS recognized that further progress was needed in the transformation of national

telecommunications and ICT policies in many countries, and that international technical assistance and best practices should be shared as widely as possible to facilitate these goals:

“There is an overwhelming need for technical assistance with planning, capacity-building, comparative research and analysis, as well as financial support for public investments in government ICT networks and facilities. ... One of the key roles that development assistance can play in this regard is to mobilize national forums and consultative processes at the highest levels of government, and also to follow up policy development exercises with affirmative, coordinated implementation projects across the spectrum of ICT sector initiatives.”

Similarly, the Tunis Agenda recognized that key pre-requisites to effective utilization of financial mechanisms included, among others:

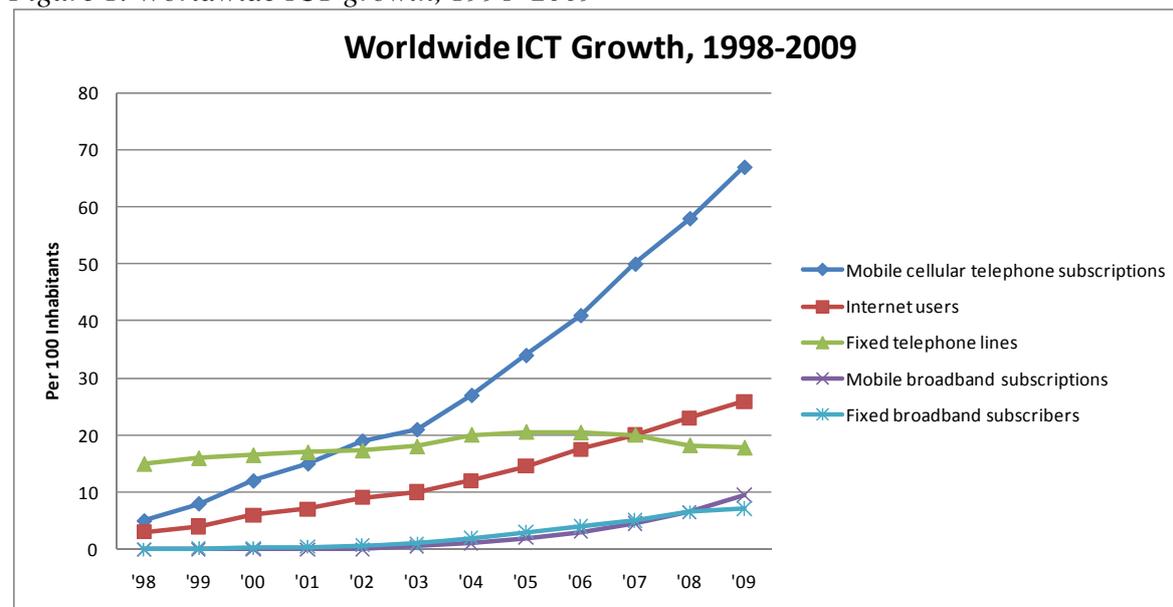
“26. a. Creating policy and regulatory incentives aimed at universal access and the attraction of private-sector investment.

“b. Identification and acknowledgement of the key role of ICTs in national development strategies, and their elaboration, when appropriate, in conjunction with e-strategies.”

2.2. Key developments since WSIS

The years since 2005 have seen continued rapid growth and evolution in the global ICT sector, particularly in developing countries, where markets have been expanding steadily, while the role and utilization of technologies for all forms of communication have penetrated further into the basic structures of these societies. This expansion is largely attributable to the transformation of national policy regimes to encourage competitive entry and the free flow of financial resources into this increasingly vital sector. The impacts of this global ICT revolution are visible:

Figure 1. Worldwide ICT growth, 1998–2009



Source: ITU (2009b)

Clearly the most dramatic development has occurred in the cellular mobile telephone market, which has become by far the dominant means of communication for the entire world, in a very short period of time, by historical standards. In part because cellular networks and licenses were new to virtually all countries, and legacy monopoly State telecom enterprises were not necessarily in the best position to deploy these networks rapidly, these market segments have often been quickly opened to competition by multiple new suppliers, typically involving foreign investment by an array of aggressive players from throughout the world. Their investments have fueled incredibly rapid growth, and that growth has fueled yet further investment, in the ideal virtuous cycle for industry expansion.

Further supporting the continued expansion of ICT markets has been the ongoing trends of privatization of many State-owned operators, the creation and enabling of national communications regulatory authorities, and the adoption of national telecommunications and ICT policy documents, strategic plans and legislation, embracing this sector as a critical component of the development agenda, and channeling resources and political will into promoting ICT opportunities (see the example of Ghana in Box 1).

Box 1. Ghana's National Telecommunications Policy

The example of Ghana is illustrative of an effective policy framework that has been successfully implemented in the past few years. The Government adopted both a national ICT Policy and then a National Telecommunications Policy (NTP) in 2005, while also revising and introducing a range of new national legislation to support these policies. The NTP emphasized market-oriented, competitive development. Among its key statements of principles:

“The Government is convinced that the interests of consumers and businesses in Ghana to achieve optimum access to the best quality and most cost-effective telecommunications services will be accomplished through the wisdom and incentives of the competitive market. To this end, this Policy seeks to establish conditions that will be most favorable to encouraging further sector growth, and reorientation of the overall market structure, through affirmative liberalization and competition policies...”

“The development of telecommunications in the Republic of Ghana shall be based upon principles of open markets and fair competition. To the greatest extent possible, the Government shall encourage telecommunications growth through the initiative and innovation of the private, competitive marketplace at all levels, with particular emphasis on promoting local entrepreneurship and socially responsible investment, including firms that encourage equal employment opportunities and gender equality.”

As a result of this policy, a wealth of new licenses and investments has gone into the Ghana telecom sector, with mobile telephone services, as would be expected, leading the way. As many as six mobile licenses have now been issued, along with dozens of licenses for ISPs, data service providers, and other operators. At the time of its adoption, the NTP set a target for “National penetration of universal telecommunications service to reach 25 per cent of the population, including at least 10 per cent in rural areas, by the year 2010”. In fact, by mid-2009, telephone penetration (fixed and mobile) had exceeded 50 per cent of the population, and was on track to surpass 60 per cent.

Source: Government of Ghana, 2004

For their part, international finance institutions and donors have continued to support policy reforms and initiatives as a priority focus, to promote further market expansion and access to competitive private finance. As one valuable example, the World Bank's infoDev programme, together with ITU, sponsored the creation of a new and extensive online “ICT Regulation Toolkit” (ITU/InfoDev, 2010), which provides detailed information, ideas, and extensive

examples and references to support regulators and policymakers in all aspects of ICT policy development. Such initiatives have contributed strongly to the steady pace of reform and growth in the global ICT sector, in developing countries especially.

2.3. New challenges and opportunities

The recent progress made in the evolution of telecommunications and ICT policies represents one of the remarkable success stories of global development in the past decade. The unrelenting increase in investment and expansion of communications, while far from complete, provides very encouraging testimony to the effectiveness of market-oriented reforms, and hence points clearly in the direction of the path ahead. For the fundamental purpose of mobilizing financial capital to invest in ICT networks and services, a mix of open markets, free and fair competition, minimal restrictions, technological neutrality, and competent, effective regulation has proven itself repeatedly. Many of the remaining bottlenecks in national ICT objectives, including those discussed in further sections of this paper, could be greatly reduced or eliminated with additional doses of competition opportunity.

At the same time, however, the accelerated transformations of the ICT sectors of nearly every country continue to introduce new challenges for policymakers and regulators, who must cope with constantly changing technical and market conditions. The key imperative remains to enable and encourage investment financing of ICTs for development objectives, and to ensure that the market and regulatory environment facing current and potential investors will allow maximum deployment of resources, in the most equitable and advantageous ways possible. The question will be: How should these principles and objectives be applied to new circumstances, which don't precisely conform to the experiences of the recent past?

Some prominent trends and issues that will require new ideas include:

- **Effective management of competition:**

Opening markets to new entry and reducing restrictions on licenses represent only the first steps in establishing effectively competitive markets. The more difficult challenges arrive with the need to regulate and manage competition, especially as the complexity and size of the market grows dramatically. The initial imperatives in this area involve ensuring that fair competition takes hold and is allowed to thrive on an equitable basis. As discussed in the TFFM report, the most crucial step in this process is to develop an effective interconnection regime among all telecommunications operators in a market. While many countries have made significant progress in this area, full implementation of competitively neutral and cost-oriented interconnection practices remain a challenge for many fledgling regulators in newly open markets. In these cases, it is likely that costs, prices and market structure continue to be out of line with their true potential, and implementing world-class interconnection standards should be a top priority, for both national officials as well as their international partners.

There are other challenges to manage long-term competition effectively. In the initial growth stages, as new entrants are helping to expand the overall size of the market, they may be less concerned about competing directly with each other to retain or capture established customers. This can lead, for example, to a de-emphasis on investment in quality of service or differentiation and innovation. Some countries where cellular markets have grown dramatically fast through widespread new entry have also seen declines in

service quality standards, especially in increasingly congested urban markets, as competing carriers see little incentive to pay for new capacity upgrades as long as the market is growing on its own. There are also risks that major operators will achieve dominant status in a market, or act in oligopolistic fashion, maintaining prices artificially high for consumers while squeezing out smaller competitors. As more services and markets converge (see below), distortions arising from vertical integration and alliances may also appear. These types of tendencies may be new territory for regulators in developing countries, which have only recently begun to take on the skills and knowledge necessary to oversee complex and sophisticated market behavior. The path ahead for regulatory authorities worldwide thus involves a difficult goal of keeping up with constantly changing industry dynamics while seeking to guide the market toward sustainable and beneficial competitive balance.

- **Regulatory reforms in view of convergence:**

The pace of technology and market changes has surpassed in many ways the licensing regimes that have created the current market structure of most telecommunications sectors. Distinctions between fixed and mobile networks, between voice and data, among local, long distance and international segments, are increasingly artificial, as interconnected operators deploying a mix of advanced platforms can readily deliver a combination of diverse services utilizing the same infrastructure. In this environment, many regulators are moving toward removing these distinctions in their licensing regimes, and adopting “Unified Licenses”, which permit operators to provide virtually any communications service over any type of network or technology platform, subject to only the most minimal restrictions to ensure service quality and proper business practices. This process becomes even more significant as still newer generations of technologies approach the market, from WiMax wireless broadband to 3G cellular networks and even the planned 4G or “Long Term Evolution” (LTE) generation of advanced mobile broadband, for which investors will be looking for wide flexibility to deploy a range of integrated services.

A related imperative as licensing reforms are considered is to review spectrum allocation plans, in accordance with ITU international standards. In many countries, frequencies have been assigned to existing operators and a variety of low-priority uses on the basis of older technology and service definitions, and some portions of the spectrum may be underutilized or not in use at all, but still not easily available for new allocations. In the context of converged, unified networks and services, appropriate and adequate frequency assignments represent the single most critical resource required for any operator to compete effectively in the market. To optimize further market development, regulatory authorities must consider how best to allocate this resource, ideally on a technology- and service-neutral basis.

Another implication of convergence is the increasing overlap of the markets for information content and for the pure transmission of data signals. Even the traditional distinctions between radio and television broadcasting (as well as newer cable TV and satellite broadcast systems) and “common carrier” telecommunications networks are becoming anachronistic, as more users receive audio–video programming via the Internet, and broadcasters utilize a range of transmission media. Where countries have previously established separate regulatory treatment associated with media content, they must now

consider how these rules should be adapted to the new media arriving with the Information Society.

- **Consumer protection:**

Most developing countries do not have a well-established body of consumer protection law and enforcement generally, let alone rules specific to the telecommunications competition environment, and the new world of cyber risks and problems. Competitive markets carry the threat of mistreating customers. Some companies may mislead customers with practices, such as overcharging for services or creating unfair restrictions and obligations, thus diminishing the benefits of open competition. Regulators in much of the world have been burdened enough with merely opening markets to allow robust competition, and often do not have the staff or expertise to establish measures to monitor and prevent a variety of inappropriate practices by ruthless competitors. This will be an area in which regulatory and policy responsibilities should only increase in the years ahead, if liberalized markets are to achieve their purpose.

Meanwhile, as Internet access spreads further into mainstream populations, a host of new and serious consumer protection issues are arising, which carry fundamental risks not previously encountered with other, less sophisticated technologies. These include the need to protect consumers' privacy, identities, and privileged data, and measures to mitigate the damaging effects of computer viruses and spam solicitations, as well as to prosecute those in the society who may be perpetrating these schemes. These are challenges that the entire interconnected world is still wrestling to overcome, but it is increasingly evident that as newer users from less regulated societies join the global cyber community, the incidence of fraudulent and malicious activity increases disproportionately. Again, most governments and regulators do not have the resources, especially in these highly technical areas, to address such abuses.

This is another area where intensive international cooperation, including technical and financial assistance, would seem to be advantageous. Without a major initiative to combat cyber crime coordinated among international stakeholders, ideally *before* the inevitable exponential increases in Internet users, and scammers, that will accompany the successful implementation of so many other ICT policy initiatives.

3. Financing backbone infrastructure

3.1. Issue summary and background

One of the most fundamental barriers to more rapid and efficient development of ICTs in much of the developing world is the lack of available and affordable transmission capacity in national and international “backbone” networks. As traffic demand has grown exponentially, particularly for long-haul and international voice and data communication, the limitations of these wholesale transmission networks have become more apparent, with significant impacts upon prices for services and market competition. Backbone networks invariably require the highest upfront investment in major infrastructure, thus imposing the greatest burdens and potential risks upon investors. They typically involve a combination of transmission technologies, from fiber optic cables (terrestrial and undersea) to microwave towers to satellite systems, and they must be fully linked across often harsh terrain in remote areas: mountains, jungles, oceans, deserts. For these reasons, the financing of backbone networks depends upon large-scale investments, often by a combination of Governments, major network operators, international investors and partners, as well as donors and financial institutions.

In the past, such backbone networks served mainly to transmit switched voice telephone calls throughout the country and around the world, and capacity demands were essentially a linear function of the number of telephone subscribers. In the twenty-first century, however, backbone networks have become much more of a lifeline for the full range of global communication traffic, and capacity utilization has skyrocketed. Nearly all traffic is now digital and an increasing proportion of voice is transmitted via Internet Protocol (IP) packet switching, so that the vast majority of transmissions worldwide are in digital format, indistinguishable between voice and data. And the volumes of traffic have been increasing relentlessly as voice usage has continued to climb and worldwide Internet traffic – which increasingly includes high-bandwidth image, audio, and video transmissions – has saturated global networks.

As a consequence, the demand for additional backbone bandwidth throughout the world has grown steadily. In less developed countries, the barriers represented by insufficient capacity, including the resulting premium prices for both international and domestic connectivity, have become a critical impediment to Internet market growth in particular. As stated in the TFFM report:

“In certain areas, notably rural and outlying ones, there is often insufficient private sector investment interest despite the offer of government incentives. Where such a strategy fails, full public funding for the deployment, ownership and operation of a broadband network is often the only recourse – especially where governments, notably at the local and municipal level, have regarded broadband infrastructure as an essential public utility and its rollout as a public sector responsibility.”

The report went on to suggest cooperative strategies and partnerships that should be considered to help promote greater investment in remote backbones, including further elimination of entry barriers and introducing open access principles, mitigation of financial risk through demand stimulation, and joint infrastructure development together with other utilities. Based on this assessment, the Tunis Agenda recommended that greater international financial resources should be directed toward:

“23. c. Regional backbone infrastructure, regional networks, Network Access Points and related regional projects, to link networks across borders and in economically disadvantaged regions which may require coordinated policies including legal, regulatory and financial frameworks, and seed financing, and would benefit from sharing experiences and best practices.

“d. Broadband capacity to facilitate the delivery of a broader range of services and applications, promote investment and provide Internet access at affordable prices to both existing and new users... and

“27.b. Enhancing regional cooperation and creating multi-stakeholder partnerships, especially by creating incentives for building regional backbone infrastructure.”

3.2. Key developments since WSIS

To a considerable extent, the much-heralded expansion of mobile voice telephone networks throughout the developing world in recent years has overshadowed the continuing, and even growing, disparities between the least developed countries and the rest of the world in other areas of ICT infrastructure. In particular, the industrialized and emerging economies are seeing broadband Internet services become increasingly standard and widespread (although not yet truly universal), and the vast bulk of online services and applications are becoming bandwidth-rich, and hence less accessible to older, narrowband and dial-up technologies. In sub-Saharan Africa, especially, although Internet usage has grown substantially in percentage terms, levels of overall Internet penetration remain starkly low: less than 7 per cent, compared with world averages of over 24 per cent (see table).

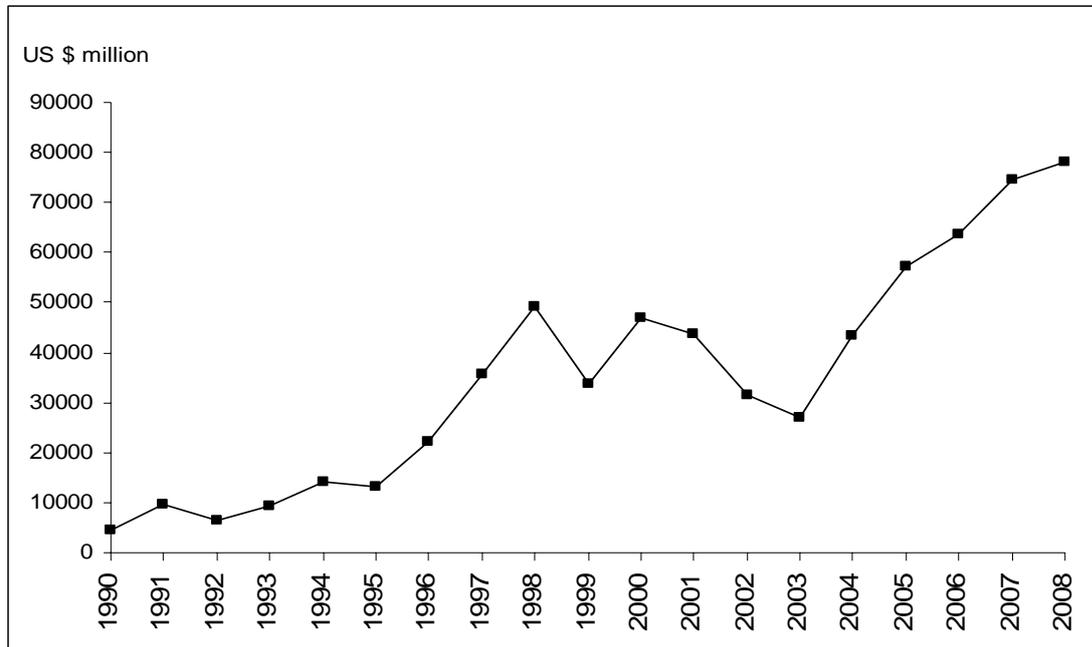
Table 1. World Internet usage and population statistics

World Regions	Population (2009 Est.)	Internet Users Dec. 31, 2000	Internet Users Latest Data	Penetration (% Population)	Users Growth 2000-2009	Users % of Table
Africa	991,002,342	4,514,400	65,903,900	6.70%	1359.90%	3.90%
Asia	3,808,070,503	114,304,000	704,213,930	18.50%	516.10%	42.20%
Europe	803,850,858	105,096,093	402,380,474	50.10%	282.90%	24.20%
Middle East	202,687,005	3,284,800	47,964,146	23.70%	1360.20%	2.90%
North America	340,831,831	108,096,800	251,735,500	73.90%	132.90%	15.10%
Latin America/Caribbean	586,662,468	18,068,919	175,834,439	30.00%	873.10%	10.50%
Oceania / Australia	34,700,201	7,620,480	20,838,019	60.10%	173.40%	1.20%
WORLD TOTAL	6,767,805,208	360,985,492	1,668,870,408	24.70%	362.30%	100.00%
NOTES: (1) Internet Usage and World Population Statistics are for June 30, 2009.						

A World Bank report highlights the disparity in Internet access and backbone networks within Africa in particular, and notes that “the current backbone network infrastructure in sub-Saharan Africa is extensive but it is predominantly low capacity, wireless-based infrastructure designed to carry voice communications traffic. The current network infrastructure is not capable of carrying the volumes of traffic that would be generated if affordable broadband connectivity was available on a mass-market basis.” (Williams, 2008) At the same time, there has also been a significant lack of international bandwidth connecting countries in Africa and

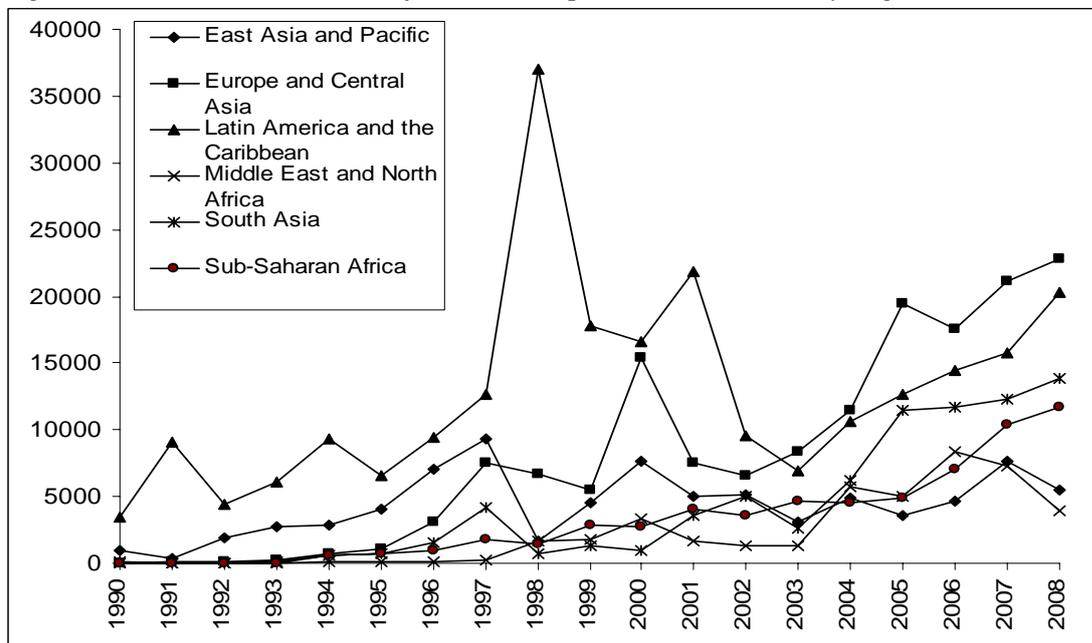
other regions to the global Internet. The impact of these low levels of supply is that prices for data transmission, for example leased line capacity for Internet Service Providers, can be prohibitively high, suppressing the entire market for Internet development.

Figure 2. Worldwide private investment in telecom infrastructure, 1990–2008



Source: The World Bank (2009)

Figure 3. Worldwide telecom infrastructure private investment by region, 1990–2008



Source: The World Bank (2009)

The supply of telecommunications infrastructure investment is sensitive to changes in the economic climate. Globally, investment in telecom infrastructure suffered from a dramatic decline during the dot.com crisis at the turn of the millennium, but has since picked up momentum. The picture for international backbone network development, at least, is now

becoming more promising on the whole. At the regional level, infrastructure investment in sub-Saharan Africa has experienced less fluctuation than it has in many other regions of the world.

There has been a flurry of recent activity in the realm of international backbone infrastructure development, particularly focused on Africa. Among the new projects that are at some stage of development are the following:

- Globacom, a major African cellular operator, has invested in the Glo-1, a 9,400-km submarine cable which connects 14 countries in West Africa through Portugal to the United Kingdom on a 1.28 terabits-per-second (tbs) capacity cable. This cable only became operational in September 2009, and will soon be connecting multiple countries in the region;
- SEACOM is also planned as a 1.28 tbs submarine fibre optic cable connecting East Africa to Europe, Asia and the rest of the world. SEACOM is privately funded and three quarters African owned, and expected to provide bandwidth on an open access basis;
- The Main One Cable is also planned as a 1.28 tbs undersea cable system, intended to span 14,000 km and provide additional capacity for international and Internet connectivity to countries between Portugal and South Africa on the West Coast of Africa. The project is designed in two phases, both of which are scheduled for completion in May 2010;
- The Eastern Africa Submarine Cable System (EASSy) is an initiative to connect countries of Eastern Africa via a high bandwidth fibre optic cable system, from South Africa to Sudan and the rest of the world. The project, funded by the World Bank and the Development Bank of Southern Africa, was initiated in 2003, but has met with delays in arranging the coalition of governments and private investors;
- The ACE (Africa Coast to Europe) submarine communications fibre is a 14,000 km cable system planned to run along the West Coast of Africa between France and South Africa, expected to become operational in 2011 with a minimum capacity of 1.92 tbs.

This surge of interest in supplying international capacity to Africa reflects high expectations that Internet traffic will soon be growing in a pattern similar to the explosion of mobile voice service demand. By delivering the needed capacity to permit such Internet usage at more affordable costs, these projects may well catalyse such new demand.

Since telecommunications infrastructure investment accounts for a large portion of capital expenditures in many countries, it is likely to be adversely affected during economic downturns. It is reasonable to believe that decreased access to private capital will be most deeply felt by developing countries. In addition, as many of the donor funds for the ICT sector have been diverted to pay for domestic stimulus packages, it is plausible that many donor-funded projects will suffer from underfunding and eventual termination. Although the extent of the current decrease in donor funds is yet difficult to determine, policymakers should nonetheless consider employing countercyclical measures to stimulate ICT infrastructure development. Financing the ICT sector can be secured by either injecting public capital that is no longer available from the private sector or providing economic incentives to attract private capital. In particular, countercyclical fiscal stimulus packages that target building broadband infrastructure can potentially foster long-term economic growth and development.

3.3. New challenges and opportunities

The upsurge of recent and anticipated investments in new international backbone cables provides strong encouragement that many of the bottlenecks in this area are being addressed, including in some of the least developed regions. If the projects all proceed as planned, their impact could be substantial on many levels: opening up additional avenues for both international and domestic competition in wholesale and retail Internet services, driving down capacity prices, fueling opportunities for other new infrastructure investors, such as WiMax networks, while consequently spurring Internet demand. To the extent these trends are relatively new and tentative – and the impact of the global financial crisis remains highly uncertain – policymakers and other stakeholders may prefer a “wait and see” attitude before evaluating their impact, and the scope of the remaining international gaps in backbone investment and finance.

However, there are several areas where concerns raised at the time of the World Summit are still evident, and other new concerns as well as opportunities are also presenting themselves. In addressing the goal of continued expansion of backbone network capacity and availability to promote ICT development, it may be worth directing focused attention on these issues:

- **Further development of national, rural backbones:**

As discussed in the World Bank report, there are still many least developed countries where national conditions do not favour development of domestic backbone networks across rural regions. Regulatory policies may continue to restrict the number of entrants, the types of technology that can be deployed, and the networks and services that can be connected to new backbone infrastructure. Beyond these barriers, there are also legitimate economic constraints facing potential investors, which may need to be mitigated through various forms of public-private partnerships. As the report suggests:

“A number of different models for these partnerships have been implemented around the world. These include (a) competitively awarded subsidies provided to private operators to build open-access networks; (b) partnerships with existing operators to develop open-access networks as consortia; and (c) providing financial incentives for operators to develop networks in under-served areas.” (Williams, 2008)

In those countries where national backbone capacity remains inadequate to serve and stimulate growing ICT traffic demand, a combination of loosening restrictions on market entry and creating such positive incentives should be strongly considered as a strategic development priority.

- **Open access and infrastructure sharing:**

When new backbone infrastructure is built, the market will benefit most from a regulatory framework that moves away from traditional exclusivity arrangements that serve to maintain high prices and artificially suppress wholesale and retail supply. Advocates for liberalized investment in backbone networks are increasingly pushing for “open access” principles. As outlined in one recent paper (Ó Siochrú, 2009), these should include:

- **Access is open to all:** The network is “plug and play” where any service provider is entitled to ask for and gain access, including those at the periphery of the networks. This means that small and local players can use it to deliver their services;

- **Technology-neutral regulation:** All technologies should be permitted to plug-in, as long they have the appropriate physical attributes. Regulation should encourage innovation in technologies;
- **Fair and non-discriminatory access:** No service providers should be discriminated against or given favourable deals. Competition should be encouraged in service areas;
- **Transparency to ensure fair trading:** Tariffs and prices between the backbone and service suppliers should be transparent;
- **Everyone can connect to everyone else:** No providers should be blocked from connecting with others, and bandwidth access from local to international should be readily available.

Some investors and operators will resist measures to require open access, if they see market advantages in exclusivity, and expect to repay their capital outlays through such arrangements. Similar arguments have often made it difficult for regulators to introduce other forms of infrastructure sharing policies in many countries, where it would ultimately be more efficient for operators to utilize the same towers, poles, underground conduit, and similar support structures, rather than duplicate investment. In the long run, however, from the perspective of development objectives, it may be preferable to establish strong open access and sharing rules.

4. Financing universal access

The question of “access” ultimately dominates nearly all discussions of the Digital Divide and similar metaphors for global disparities in availability of information technologies and resources. Access is the most basic prerequisite to obtaining the benefits and opportunities of information and communication: (a) access to network connectivity; (b) access to computers, phones, and other equipment and facilities; (c) access to relevant information itself; and (d) access to the skills and knowledge needed to take advantage of modern ICTs. Typically in policy forums, the main focus has been on technical network access: the extension of national telecommunications infrastructure beyond the limits of urban and affluent markets, into remote, high-cost, and low-income areas in developing (as well as developed) countries.

Even where backbone networks extend reasonably far into these regions, they need to connect across the “last mile”, to local communities and individual households, businesses and subscribers, which is typically the most costly component of the network on a per-unit basis. Where the markets that are reached by such connections are most often small and likely to have little income to spend on telecommunications services, the anticipated financial return on investments in fixed local access networks is very low or negative. The economics of wireless mobile networks have begun to significantly change this dynamic, as signals can reach entire geographic zones from one transmission tower, although the cost of constructing towers and base stations to serve very remote locations can also be prohibitive in many instances.

Perhaps the most prominent and increasingly common financial mechanisms that have been introduced to address these access challenges are so-called Universal Service Funds or Universal Access Funds (USFs/UAFs). Modeled initially after USFs that were established in North America and Europe to achieve truly “universal” telephone service, most of these funds in the developing world have aimed to help subsidize expansion of access networks to rural and high-cost areas, typically on an incremental (rather than universal) basis. The standard approach involves imposing a fee on licensed telecommunications operators (for example, 1 per cent to 2 per cent of gross revenues), which is contributed into the fund, to be managed either by the national regulatory authority or an independent agency; this money is then allocated to provide financial support to rural access and other ICT development projects, often through a competitive bidding process, in which the same operators that contribute to the fund are invited to bid for the subsidies and the mandate to deliver rural access and services.

The TFFM report noted the strong progress that had been achieved in financing access networks in the developing world, particularly in the growth of cellular telephone services, while also acknowledging that the economics of rural access remained challenging for many investors and governments. It presented a variety of models and trends that indicated promising opportunities to channel additional sources of financing toward rural networks and services, including USFs/UAFs, but also other sources of investment and finance, among them the emerging concept of local community-based investment and ownership. In this area, the report noted that “communities are now taking the lead responsibility, often with public authorities and private partners, in initiating, designing, resources and managing network solutions.” Examples of local telephone cooperatives, social enterprises, and public-private partnerships at the local level, often utilizing new technologies such as WiFi to deliver service across a village, were cited as promising new approaches. On the whole, the report emphasized that a combination of methods for increasing financial support for local ICT access is called for, through integrated strategies that expand market opportunities, leverage

available funds, mitigate investor risk, and involve local communities as well as other public institutions, on a coordinated basis.

The Tunis Agenda highlighted the need to focus particular attention on the potential and needs of US/UA Funds, by directing additional resources toward:

“26.c. Developing institutional and implementation capacity to support the use of national universal service/access funds, and further study of these mechanisms and those aiming to mobilize domestic resources.”

4.1. Key developments since WSIS

Over the past several years, a great deal of attention has been devoted to access development policies and mechanisms, with particular emphasis on Universal Service/Access Funds as a key source of financial support for such access. At the same time, developments in the telecommunications industry have moved forward so rapidly that the basic issues traditionally raised under network access policy discussions have shifted dramatically. Until recently, most such policies and funds focused initially on expanding access mainly to basic voice telephone service, typically through subsidy of public telephone installations in rural locations. While these programmes succeeded in providing such basic voice access in thousands of previously isolated villages, particularly in Latin America, more recent market trends have rendered this approach to Universal Access nearly obsolete.

The explosive growth of cellular mobile telephone coverage has brought access to voice telephones within reach of hundreds of millions of users who were previously without any form of telephone service, and this form of access is far more convenient, flexible and useful than increasingly outdated public telephone booths. The rapid expansion of this new market has in many cases almost fully overtaken the slower implementation of established Universal Access policies, resulting in an increasingly common paradox: subsidized and/or mandated public telephones being installed in locations that are still officially designated as “unserved”, but where mobile phones are already widely in use. These public phones often see little or no traffic, yet must be maintained under anachronistic contractual or license terms arising from these outdated Universal Access policies.

These changing dynamics have compelled re-examination of access policies and funds, even as many countries have only recently established them, often without yet reaching the point of implementation and disbursement. Several important studies and reports since the WSIS concluded have taken a close look at the experience, accomplishments and challenges of Universal Access policies around the world, leading to an emerging set of new perspectives on approaches to and objectives for ICT access, as well as a formidable body of knowledge concerning the effectiveness and problems of various UA/US methods.

One of the most extensive studies was sponsored in 2005 and 2006 by the World Bank and Regulatel, the association of Latin American telecommunications regulators, to study the Universal Service experience of the entire Latin American region, where many of the most well-established and successful policies and funds (along with some unsuccessful ones) have been in place for more than a decade. (Stern and Townsend, 2006) The study found that USF mechanisms in several countries (e.g. Peru, Chile, Colombia, and the Dominican Republic) had been quite effective in channeling subsidies from the sector to support both rural public telephones, as well as more robust rural telephone and even Internet services. On the other hand, a number of countries had been relatively unsuccessful in implementing their US/UA

funds, for a variety of legal, political, and bureaucratic reasons (Brazil being the most notorious example). A smaller study recently conducted by ITU focused on the experiences of Africa, which are generally newer than those in Latin America; this study found that a majority of funds in sub-Saharan Africa were not yet operational, and had not adequately planned and organized for implementation of the Funds' mandates. (ITU, 2009a)

Certainly, one of the main criticisms directed at many funds has been that they have often taken in far more money than they have been able to disburse, so that large sums – which originally came from telecom industry customer payments – are sitting in designated bank accounts without being deployed to serve a purpose. These circumstances have created legitimate doubts about the efficacy of utilizing this type of mechanism to promote access, despite the many positive examples that have also been demonstrated.

4.2. New challenges and opportunities

It is clear that the model of some form of public fund to support equitable ICT access will remain a key financial mechanism and a cornerstone of many countries' development policies for some time to come. Even the most advanced OECD countries have instituted Universal Service Funds to promote basic communications access for all citizens, and many have augmented these recently with "stimulus" funding to support expansion of broadband and Internet access. Meanwhile, many developing countries have only very recently passed legislation or introduced regulations to establish new USFs (e.g. Thailand, Kenya, Saudi Arabia, the Eastern Caribbean States, among numerous others), but have yet to implement the formal rules and procedures that will determine how the fund is managed and spent. Those that have been in operation for a number of years are now generally wrestling with new questions of priority objectives, efficient use of resources, and institutional capacity.

Going forward, there are a range of key questions and challenges confronting agencies responsible for defining Universal Access policies, and for implementing and overseeing those policies and the related Funds. Some of the most salient of these issues include the following:

- **Reconsidering access objectives and priorities:**

With the near saturation of mobile telephones and the diminishing urgency of connecting people for minimum-level public voice access, advocates of Universal Access must reconsider the objectives that such policies should now pursue. As these shifts in the landscape have occurred, it is now becoming commonplace for access policies, as well as funds, to highlight a range of new capabilities and services in their goals for inclusion of all citizens in the Information Society. But simply identifying "Internet Access" or similar terms within the general scope of a policy or fund mandate does not adequately define the priorities for such access, nor the limits and means for achieving it. Some key questions must be addressed:

- To what extent should access policy embrace Internet, even broadband, access as a priority goal?
- How should higher-end services be balanced against minimal connectivity, when considering allocation of scarce resources?
- Should US/UA funds or other mechanisms subsidize areas such as computer, hardware, software, information content, training, etc.?

- How should the impact of new Universal Access policies be measured and evaluated, to ensure that they are producing worthwhile results?

- **Institutional management of UA/US funds:**

The need to implement more effective institutional management of many Universal Funds is clearly a top priority, to unblock money that has already been collected in many cases, and to ensure that all resources are utilized efficiently and appropriately. Too many funds have been established without an adequate institutional plan, sufficient trained staff, and operational procedures that are realistic and compatible with the mission and capabilities of the administration. There are also often conflicting political pressures and legal disputes that hamper effective fund implementation. Given the large amounts of money that many such funds collect, they should ideally be governed and operated in a manner similar to any other financial institution: with fully transparent criteria for allocating funds and procedures for making decisions, with in-depth due diligence supporting all project plans, and with staff that have expertise in finance, accounting, economics, and other relevant fields.

To reach this level of sophistication and professionalism in their functions will take time and investment by the funds, and technical assistance from outside sources in most cases. In principle, such institutional measures should be adopted before the fund collects significant sums from the industry. Where funds have already been established, but have not functioned effectively, it may be appropriate to suspend collections, and possibly even reimburse some funds, while bringing the fund administration up to adequate operational standards, so as to restore confidence and ensure a more smooth process of financial transfers in the future.

- **Enhancing market-orientation and sustainability of access financing:**

Universal Fund administrators, even where they are well organized and supported, face difficult challenges to ensure that their funds are spent in the most effective manner possible, to promote sustainable market development that brings tangible and lasting benefits to target areas that truly require public assistance. The Access Gap theory and methods depend upon in-depth study of regions where subsidies might be required, to understand local market and demographic conditions, and to design support programmes that can be cost-effective. As a starting point, administrators need to create mechanisms for collecting data and monitoring market status on an ongoing basis. They also need tools to analyze market conditions, and should collaborate with industry players to maintain up-to-date knowledge of technology and cost trends. All of these resources should be geared toward implementing financial support practices that help launch commercially sustainable services wherever possible, while limiting perpetual or long-term subsidies to valid public service needs.

- **Decentralized and community-based approaches:**

As suggested in the TFFM report, there are potentially important new ways to approach the delivery of ICT services in rural, small villages and other areas not served by the established markets. While traditional communications networks have most often been centrally owned and operated, with all local service directly linked to the main provider, an increasing body of experience demonstrates that decentralizing this arrangement can

yield benefits for local populations, while reducing costs and risks for network operators. The types of options available, and examples from locations around the world, are quite varied. For example, local community-owned cooperative telephone companies have proven viable in a number of countries (indeed, this model dates back more than 100 years in some places). An alternative approach involves setting up local franchises, which may be affiliated with larger national operators or organizations, but owned and operated by entrepreneurs within the community.

With the advent of wireless broadband technologies, such operations can be established relatively easily. Some models anticipate initially providing basic public access through community telecenters, then expanding to offer both fixed telephone and Internet access to residents and local businesses, building off the same foundation. Even where cellular signals may be available, this approach may have the potential to expand the choices available to communities and end-users. The challenge for those seeking to encourage and implement such decentralized solutions is both to prove the viability of the business model, and then to develop workable management plans, utilizing the institutional and financial support of government, international institutions, and US/UA Funds where appropriate.

5. Financing applications and content

The initial focus of most “Digital Divide” concerns and related financing initiatives was understandably on the development of basic infrastructure, investment in networks and technology platforms, and promotion of competitive market models for telecommunications service delivery. But as the Internet and related global information resources have continued to expand and grow in influence in all levels of society on a worldwide scale, it has become increasingly apparent that these electronic transmission media are only the vehicles through which the truly valuable commodity – information – is accessed and shared. Merely investing in networks and facilities, without paying attention to the information content that flows among users of those networks, is almost like investing in farming equipment and machinery with no regard for the crops that will be grown and harvested.

The ubiquitous role of electronic information throughout the developed and emerging economies, and increasingly in at least the urban and affluent areas of less developed societies, demands that socio-development policies take account of the vast “software gap” as well as the hardware gap. In fact, there is a strong synergy between the market for information content and the market for underlying digital networks and facilities, as users will be more inclined to demand and pay for Internet access to the extent they perceive that the content they will find is of value to them. For new users, particularly in the early years of Internet growth and popularity, simply being able to communicate via electronic mail and to access chat rooms and the like was a primary driver of Internet demand, and this remains the case for newer generations of users, but as the Web has grown to provide virtually limitless sources and means of obtaining every conceivable type of digital content, the value and role of Internet-based information resources can be much more diverse, and indispensable.

The range of areas in which greater access to information can help with development goals is as broad as the development field itself. ICTs have begun to enter mainstream discussions as a primary component of education, health, agriculture, employment and poverty reduction policies in general. Also, most governments have adopted some degree of e-government applications, from Web portals for government information and services to digital record-keeping and electronic procurement and transactions.

Despite the great potential value, however, progress in this area has been problematic. The dynamics of the content marketplace, however, are very different from the market for communications networks and services, and at least to date, the prospects for commercially driven, open and competitive growth in locally produced ICT content and applications in the developing world have not proven nearly as promising. Although governments and donors have put financial resources behind numerous specific projects to disseminate high-priority information to citizens, such as in the health and education fields, and through e-government platforms, these initiatives have typically been small and slow to implement effectively. Meanwhile, commercially profitable software and information service sectors are at best marginal in most developing countries, with certain well-known exceptions, such as India.

The TFFM Report recognized Applications and Content as the “next frontier” for ICT financing, noting that “the ICT revolution is about much more than telephones”, despite the continuing primary value of voice communications. The Task Force noted the heavy United States dominance and influence in all elements of the worldwide software and content markets, from computer operating systems to end user applications to television and films. As the report stated:

“Beyond the ‘access gap’, which divides the connected from the disconnected, this imbalance between creators and consumers of information is even greater, and possibly more difficult to overcome...”

“...what is most missing from the limitless worldwide knowledge base is an adequate representation of the vast diversity and richness of knowledge, ideas, experience, and imagination that thrive throughout the developing world, but rarely find their way into the consciousness of the commercially driven, mass media markets...”

The report recommended a range of areas where financing should be enhanced, such as (a) support for user-friendly, graphic based interfaces; (b) content in local, indigenous languages; (c) culturally sensitive and diverse materials; (d) self-directed content production; (d) fostering of sustainable local markets for information; and (e) support for shared, coordinated development of content, such as government applications.

5.1. Key developments since WSIS

Without question, some of the most dramatic and far-reaching developments in the ICT arena during the past several years have been in the realm of content and applications. The Internet has continued to evolve so rapidly that it is virtually impossible to keep up with all of the changing and emerging trends, but the dominant new directions for online content are unmistakable. The most prominent of these are the increasing role of broadband, multimedia content, and the explosive arrival of social networking and user-generated content.

The broadband revolution had been long anticipated, as the capacity of Internet connections and the sophistication of media sites’ services continued to grow. In the past several years, this expectation has begun to reach fruition, as computer-based and online audio and video features have become the “killer apps” for spurring broadband penetration. Digital music may be the most ubiquitous application, as the spread of iPods and MP3 players together with downloading and sharing of music files has become a worldwide phenomenon, rendering the traditional “off-line” recorded music industry almost extinct. And video applications are nearly as commonplace wherever broadband signals are well entrenched, from streaming of movies and TV shows to music videos to home video clips to embedded advertising shorts. Almost any video programming that is aired over traditional television is becoming available, in some form, on the Internet as well, together with limitless original and highly creative on-line programming. Now the most recent new trend is focusing on broadband-enabled Smart Phones, such as the iPhone and devices using the Droid operating system, for which thousands of new mobile “apps” have been developed, enriching and transforming the functions of mobile phones in countless ways.

The prevalence of broadband has also helped fuel the social networking revolution, although this phenomenon can be conducted effectively in a narrowband environment. In just a few years’ time, social networking has become perhaps the single most widespread type of online activity, and it is the application that is driving most new investment and innovation in the Information Industry – despite the fact that many of the most popular services are not yet even profitable. What is most dramatic and intriguing about this trend is the fact that nearly all of the “content” that is created and shared in social networking environments is user-generated.

The social networking phenomenon has manifested itself in a variety of distinct but interrelated forms:

- True social networking sites, dominated by Facebook, MySpace, Friendster and the like, which have millions of users around the world, and countless smaller imitation sites: members post their personal biographies, photos, artwork, comments, messages and other materials, and maintain regular (often virtually obsessive) connections via these sites;
- Weblogs (“blogs”), of which there are hundreds of thousands all over the world, from small, individual diaries to large and influential sites which attract thousands of readers and comments every day: blogs provide a vehicle for personal commentary, knowledge sharing, activism, and amusement on virtually any topic imaginable. By many accounts, the type of “citizen journalism” that they have fostered is among the leading causes of the decline of traditional print newspapers in much of the networked world;
- Multimedia content sharing sites: these are led by the video clip giant YouTube, which allows any user to upload short video files (subject to certain restrictions on copyright violations and appropriateness standards), and has become a repository for a vast wealth of serious to innocuous postings, to the degree that YouTube is arguably a new medium of communication and creativity all by itself. Other sites, including Web leaders Google, Yahoo, and MSN, also have their own video sharing features, and there are many smaller sites with specific multimedia content styles and purposes;
- Information and answer services, led by Wikipedia, the most comprehensive single collection of basic information in the history of mankind, which is built upon the revolutionary “Wiki” standard of user-generated and user-moderated content: this non-profit service is also available in dozens of languages, focusing on different countries and cultures, although the original English remains by far the largest. Other sites follow a question-and-answer format, where users can post questions on any topic, and other users can provide answers, with back-and-forth comments and verification or debate;
- Dating, matchmaking, and marriage sites, specifically aimed at bringing couples together: the more broad-based social networking sites also serve as dating media, but these targeted sites focus on identifying compatibility and partners explicitly;
- Chatting and voice/video telephony: bringing technology applications full circle, several prominent Web-based services allow for real-time, person-to-person communication, both through text-based chatting (which is also, of course, a major mobile application), as well as through Voice over Internet Protocol (VoIP telephone calls and “Web cam” connections. The leading site, Skype, has become a dominant source for international telephony, including computer-to-computer, and computer-to-phone, while others such as Yahoo Messenger and Microsoft’s Windows Live Messenger are ubiquitous worldwide for text chatting as well as voice and video.

Experience around the world is starting to demonstrate that interest in these types of peer-to-peer and user-originated communication and content is essentially universal. As Internet access and especially broadband have begun to take hold in developing countries, these same services, and local imitations of them, have immediately taken a lead in user popularity, especially among the younger generations that tend to be the most prolific adopters and users of new ICTs. In fact, China’s “QQ” network is reportedly the single largest social network in the world, with over 300 million members. However, Facebook is probably the most ubiquitous, with hundreds of thousands of members in each of scores of countries from Asia to Africa to the Middle East. (Web2forDev Gateway, 2009)

What is perhaps most interesting about these activities is that virtually none of them, even in the developing world, have been financed by government or donor investments; the social networking boom has been a grass-roots, market-driven movement from the outset, fueled by the kind of entrepreneurialism and innovation that ignited the World Wide Web in the first place.

On the other hand, there has been significant public investment in recent years in the more “socially desirable” forms of ICT content and applications. In the education field, especially, international organizations have taken strong initiatives. The World Bank’s infoDev programme for example “is developing an integrated curriculum of briefing sheets, handbooks, toolkits, case studies, best practice and lessons learned, and is sponsoring related training activities focusing on the appropriate use of ICTs in education”.(infoDev, 2010) Similarly, increasing attention has been paid to e-government programmes, particularly development of websites for the majority of national-level ministries and agencies that interact with the public, although in many cases these are relatively superficial. In other realms, such as health care, agriculture, small business management, women’s and children’s needs, and many others, there have been numerous initiatives and ideas to develop customized ICT-based information (videos, websites, interactive learning tools, etc.), but there has been little study of the impact and effectiveness of these programmes, and the amounts of finance directed toward them has been small by most standards.

5.2. New challenges and opportunities

Software and ICT content development remain largely external industries for most developing countries, with applications based primarily upon large international software firms, and only a small amount of local value added, translation, or other adaptation. Even where some domestic content is produced, for example in news reporting or basic public information, such sites are typically minor in comparison with their international counterparts. The markets for domestic Web design and custom software applications are often tiny, even as the number of national websites and Web users has been increasing. Despite many gains, the imbalances in content remain, and continued efforts are required to promote more equitable sources of content and ICT applications. In the new worldwide environment, these efforts should take account of the following potential objectives:

- **Promoting development of domestic software and content industries:**

For policymakers and financial institutions, a key challenge is how to jump-start more extensive growth of internal information content and software development, design, hosting and dissemination. Larger developing countries such as India and China have had great success, partly because they can also serve their own mass markets in their own languages, while also exporting ICT technical and programming expertise. In principle, it should be possible for any country to establish a functional and profitable software/content sector, as the only resource required is skilled personnel, and each society has its own unique interests and culture. Some new applications may be developed specifically for developing markets, such as more narrowband mobile apps. As market demand grows for connectivity in general, and particularly for broadband, it may be rewarding to help incubate such domestic programming and Web design expertise, as well as related marketing and management, on a public–private partnership basis, and to study more closely the models of successful local ICT content sectors, to spread the benefits and value of this type of information market more equitably around the world.

- **Creative adaptation and decentralization of ICT content production to include indigenous and local cultures and knowledge:**

The lack of ICT content that is inclusive of indigenous, rural and other marginalized groups and cultures, and of less developed societies in general, remains a major concern, despite some improvements. The opportunities to transform this imbalance, however, may now be greater than ever. The essence of online social networking is that the information shared is by nature local and indigenous for whoever is creating each personal website, uploading images or video, and/or chatting with other users in their own language. In the quest to decentralize content production and bring more citizens into the realm of digital inclusion, social networking may represent the most promising trend yet.

The goal for strategic allocation of financial mechanisms should perhaps be to reinforce this trend in ways that enable and encourage more widespread awareness of these tools. For example, greater emphasis should be placed on translation of application platforms (interfaces, instructions, features, etc.) into local languages and even more graphic and audio interfaces. Training and education programmes can be customized to highlight not merely passive use of technology, but interactive participation and creation of personalized content (including use of digital cameras, video, etc., and procedures to edit and upload files). Where local school programmes are incorporating ICT resources and curricula, assignments focused on producing ICT content should become new priorities, as students will undoubtedly graduate into a world in which self-designed online content will be a leading measure of one's inclusion in the Information Society. The ultimate benefit of these approaches will be not only the greater involvement of local populations in the ICT realm, but a far richer and expansive global Internet environment for all.

- **Support for public and social objectives through ICT applications and content:**

Even with the increasing advantages of non-hierarchical, user-generated content, there remain important public and social purposes for which the production and dissemination of standardized information resources are also essential. This is especially the case for e-government information and applications that must directly engage citizens, as well as for a variety of other public awareness campaigns that are linked to core development objectives, such as health, poverty alleviation, etc. Financing for many of these types of applications remains low when compared with resources that have been put into ICT infrastructure and other hardware facilities.

Part of the problem is that the benefits of such programmes, when they are implemented, are difficult to measure, as they are likely to be long-term and indirect in nature. Also, governments and donors, in contrast to social ICT users themselves, may not always be up to date with the ways in which these users interact and absorb relevant information. Heavily pedantic or technical programmes – or, alternatively, overly juvenile or simplistic productions – may alienate many in the target audience who may become increasingly accustomed to the newer, informal styles of online and multimedia communication. Here again, the goal of distributing valuable information from public sources may be served by creatively embracing these new vehicles of human social interaction. It may require a great deal of experimentation, which must be adequately and enthusiastically supported by financial resources, to learn the most effective means of serving legitimate public information purposes via these new and evolving mechanisms, but the potential rewards may again be great.

6. Strengthening capacity, promoting opportunity

Among all the issues addressed by the Task Force on Financial Mechanisms and the World Summit, capacity-building in ICTs was highlighted as perhaps the most important need, and the most under-financed. While acknowledging that a wide variety of initiatives had taken place to promote ICT training and human resource development, the TFFM Report indicated that this field was nevertheless relatively new and not well understood within the overall picture of ICT4D policies. The Tunis Agenda went on to conclude:

“22. We note that ICT-related capacity-building needs represent a high priority in all developing countries and the current financing levels have not been adequate to meet the needs, although there are many different funding mechanisms supporting ICTs for development.

“23. We recognize that there are a number of areas in need of greater financial resources and where current approaches to ICT for development financing have devoted insufficient attention to date. These include [*inter alia*]:

“a. ICT capacity-building programmes, materials, tools, educational funding and specialized training initiatives, especially for regulators and other public-sector employees and organizations.”

Part of the reason for the continuing challenges in this area is the fact that “capacity” itself is an elusive concept, embracing a wide range of human and institutional skills, knowledge, experience, and insight that are difficult both to build up and to measure in explicit, unambiguous ways. For purposes of promoting effective ICT sector development, the TFFM Report identified at least four key categories of human resource capacity that need to be strongly reinforced for any medium or long-term Information Society agenda to be achievable:

- Basic Education in the use of ICTs, as well as utilizing ICT tools to teach other topics in schools;
- Advanced Training in technical fields, as well as in job skills that require utilization of ICTs;
- Government, public sector training for public employees, especially those responsible for designing and implementing policies and regulations regarding the ICT sector, as well as managing e-government programmes; and
- Public awareness campaigns of various types, to support understanding and adoption of ICTs and related capabilities and services.

These are related, mutually dependent areas of responsibility, given that citizen interaction with ICTs increasingly occurs at multiple stages of education, job responsibilities and civil society. Ideally, effective investment in basic educational resources at the earliest stages will ultimately pay dividends by creating a more skilled work force, more effective public servants, and greater awareness of and involvement with ICTs at all levels.

One of the most overriding needs, as noted by both the TFFM and the Tunis Agenda, is to increase support to government policymakers and regulators in the ICT field itself, where many countries had not had the knowledge or skills to implement effective sector reforms, and hence stimulate market development to its full potential. In the realm of Universal Access

Funds, for example, as discussed above, a primary reason why many of these funds have been unsuccessful to date in fulfilling their mandates has been a lack of adequate staffing, technical and management skills, and other human resource needs. Yet many of these funds, which have ample bank accounts that they may have difficulty spending on Access objectives, are nevertheless prohibited by their enabling statutes from using these funds to pay for their own internal capacity-building needs. With more strategic allocation of resources toward this basic requirement, all other aspects of the ICT development agenda could be more easily achieved.

6.1. Key developments since WSIS

Capacity-building has clearly been recognized in the development community as a critical element towards effective growth of the ICT sector. Despite multiple efforts to provide training and capacity-building opportunities in the sector, however, these have often been inefficiently designed to reflect the needs and experience of the regions, and also generally costly. Most important, many initiatives have failed to produce a practical and lasting impact in the development of regulatory and policy capacity.

A recent study by infoDev (2008) provides a useful overview of capacity-building programmes and initiatives in Africa, the Caribbean and the Pacific, and identifies the following key findings:

- Chronic capacity shortages of policy and regulatory bodies;
- The predominance of one-off, short-term training courses, based heavily on developed-country models and experiences;
- Poor coordination among suppliers of capacity-building initiatives;
- Inadequate attention to the broader ecosystem of, and other key stakeholders in, effective policy and regulation; and
- Lack of clarity on the roles of, and insufficient support for, regional institutions.

The study identifies a number of capacity-building initiatives and projects with capacity-building components, including some at the university level. However, it recognizes that the existing initiatives are not fulfilling the demand for ongoing specialized training. Current initiatives may be useful and informative, but mostly lack a practical and interactive aspect that facilitates learning by doing.

To respond to this situation, ITU, infoDev and the World Bank have launched a joint initiative – The Global Capacity Building Initiative for ICT Regulators (GCBI). While still in its early stages, this \$2.25 million multi-stakeholder initiative aims at providing sustainable capacity-building opportunities, through the implementation of a framework focusing on the development and support of local and regional research efforts, as well as the establishment of capacity programmes at regional universities or training centres. To be implemented in all developing regions during the 2009–2012 period, the GCBI provides an opportunity to establish reputable specialized programmes for long-term needed capacity-building opportunities in developing regions.

ITU has taken some of the most ambitious and comprehensive initiatives in ICT capacity-building in the developing world, leveraging the expertise and interests of its members that dominate the supply of ICT goods and services to help expand the opportunities of consumer countries. The ITU Telecommunications Development Bureau (BDT) has established a Human Capacity-Building programme, (ITU, 2010) which sponsors a wide range of workshops, meetings, online training resources and Centres of Excellence around the world.

ITU has also initiated the “Connect a School” sponsorship programme, to promote linking schools to computers and the Internet. For regulators and policymakers, ITU cosponsored the infoDev ICT Regulation Toolkit, and hosts the annual Global Symposium for Regulators (GSR), among many other activities.

Many donor governments have sponsored various forms of bilateral training projects. For example, Finland recently launched the South Africa–Finland Knowledge Partnership (SAFIPA) programme, which has several concrete objectives (see Box 2).

Box 2: Elements of South Africa–Finland Knowledge Partnership (SAFIPA) programme

Component 1: Institutional development to facilitate the take-up ICT service applications

- Process involving value added instruction, the training of trainers, activities with multiplier effects, and networking both on institutional and human level.

Component 2: Expert skills building to develop ICT applications for end-users

- Seed Fund addressing education and learning sector competences and societal development issues amongst selected constituency. Special attention given to the institutional education and learning outputs as sustainability factor. Selection, upgrading and implementation of the on-going projects and Identification and preparation of new projects and stakeholder groups.

Component 3: Partnership development to bring ICT service applications into market

- Stengthen the cooperation between networks and research institutions locally and globally, support PPP in the service delivery process. Open dissemination of results and ideas to innovate new development activities and promote networking.

Basic and advanced ICT training has become a significant market itself in many developing countries, where training institutions offer courses in a variety of technical skills that will most likely lead to favourable job prospects. The National Institute of Information Technologies (NIIT) of India, which established its reputation as one of the most successful training organizations in the developing world, now has franchises in more than 30 countries that are building upon the same business model.

Other programmes are offered under the sponsorship of major international ICT corporations, again in the interests of their own long-term market growth in the developing world. Intel has established several global programmes, such as the Intel Education Initiative and Learn Programme, and sponsors country-specific initiatives in numerous countries. Microsoft, Cisco, and many other technology companies provide similar broad-based training, certification, and technical assistance support.

6.2. New challenges and opportunities

Despite the undeniable proliferation of so many forms of ICT-related capacity-building programmes throughout the world, there is little question that this area remains one of the most elusive challenges in the realm of ICT development and finance. In fact, as access to ICTs grows, the need for capacity-building in all areas increases in at least the same proportions, if not more. And since there is typically little direct linkage between sector

revenues and funding of education, training and awareness programmes, the need to channel financial resources toward such programmes through partnerships, public policies, and international coordination is likely to remain paramount. Beyond simply continuing and expanding the variety of established approaches, there is certainly room to consider new ideas and options, which might help to accelerate and better institutionalize capacity-building as a core element of ICT development strategies. Some issues and objectives that should be taken into consideration in such programmes include the following:

- **Develop methods and studies to improve measurement and assessment of ICT capacity building programmes:**

A key challenge of capacity-building objectives is to determine how effective different methods and approaches may be in actually improving skills, awareness and ultimately meaningful utilization of those resources. But the connection between any particular training course or public awareness campaign and end-result benefits, whether for the individuals involved or for the sector as a whole, is very difficult to measure. In many cases, these benefits will occur only over time, and only with the accumulation of knowledge through a variety of sources. Yet those who are responsible to design capacity-building programmes, and to allocate limited funding to support them, need some useful metrics to understand the most cost-effective tools and methods. While there have been a handful of studies of this issue, it merits closer, more expansive review, and wide debate and exchange of ideas among experienced practitioners of ICT capacity-building, including detailed findings and recommendations on the nature, scope, and focus of programmes that should be given priority support.

- **Increase coordination and standardization of capacity building across governments, international agencies, private sector:**

In line with the previous issue, there is a need to increase the coordination of capacity-building initiatives among the wide scope of organizations and institutions that are in some manner involved in them. Many training workshops and classes, technical assistance programmes, published and online materials, and similar resources contain either repetitive or even conflicting information, confusing differences in approach and emphasis, and varying degrees of detail or concentration. Given that the ICT sector itself is vast and constantly changing, this situation is not unusual, but particularly for individuals in government, business, or society in general who are new to these technologies, the “noise” level of such inconsistent approaches can certainly be discouraging. More important, lack of standardization means duplication of costs and misuse of scarce training resources, especially skilled teachers and trainers. The infoDev/ITU ICT Regulation Handbook is a good example of a coordinated attempt to collect and standardize a wide scope of information in this important area, although it represents mainly a starting point for those seeking in-depth training in regulatory matters. Similar approaches to developing universally available and consistently designed materials, curricula, and methods would likely produce valuable results.

- **Consider innovative ways of linking capacity-building to other forms of content, including decentralized, peer-to-peer approaches:**

Just as the options for developing and supporting ICT content (see above) should take account of the latest trends in social networking, user-generated content, and peer-to-peer

information sharing, there may be advantages in applying these new interactive methods to capacity-building objectives as well. Practitioners and programme designers can create platforms for local users, from technicians to educators to public officials, and can share their knowledge and experiences, provide answers to questions, and interact to develop unique solutions, ideally in local languages and with reference to shared concerns and constraints.

- **Reinforce technical assistance to policymakers and regulators, with greater emphasis on hands-on capacity building:**

As indicated above, many technical assistance projects that support ICT policy and regulatory institutions in developing countries tend to fall short of their intended goals, particularly in the area of capacity-building for policy and regulatory officials. Projects that focus primarily on specific desired outcomes, such as producing a new piece of legislation or a policy statement and regulatory documents, do not often deliver enough hands-on training and learning-by-doing support to the key officials involved. Instead, outside experts may do the work of the client agency for them, with minimal substantive involvement by the appropriate decision-makers, leaving behind inadequate skills or even understanding of the policies just adopted.

To improve this situation will require much more focused attention to this type of technical and capacity support. Experts must be more often embedded within the target organizations, which requires significantly higher budget allocations for these projects, and the personnel that they work with must be free to learn on a continuous basis, meaning that the training cannot simply be a burdensome extra responsibility, but a main focus of their daily tasks. More effective and customized “toolkit” materials should be sponsored, which can be utilized and adapted by regulatory authorities directly, and these must include adequate instructions, support, and follow-up, as well as ongoing review and revision by the sponsoring institutions. As mentioned, such needs are particularly strong for many Universal Access Fund administrations, whose capacity to release and effectively deploy the large sums that many have already collected should represent an urgent priority for capacity-building support.

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