Trends in Telecom Development Globally: A Perspective from Washington

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Abstract

Both in the United States and overseas, wireless technologies are playing a significant role in development, in many cases where wireline technologies have literally fallen short. At the same time, decision-makers no longer need to be convinced of the benefits that access to and use of Information and Communications Technologies (ICTs) provide. Rather, the shift is to find the best paths to universal access and developing principles for success to share as best practices. The U.S. Government is pursuing several paths to promote more universal access to ICTs, both in the United States and abroad. The outcomes of the recent World Summit on the Information Society (WSIS) and the launch of the U.S. Digital Freedom Initiative underscore these efforts.

In early January 2004, the People's Republic of China announced that there are now more mobile customers in China than there are people in the United States of America.(1)   In late January 2004, the GSM industry proudly crowed that it expects the one billionth GSM customer in the First Quarter of 2004.(2) Up near Nome Alaska, the Bering Straits natives organized a non-profit tribal consortium called Kawerak, Inc. Twenty Inuit tribes have pooled their knowledge and resources to develop the Wireless WALRUS project – Web Access Links for Remote User Services. These native peoples have found another way to preserve their 3,000 year old presence in the Bering Strait region by using wireless connectivity over 26,000 square miles. (3)

In Tajikistan and Armenia, institutions and commercial users are using an "air bridge," or radio modem for Internet Service Provision connectivity. (4, 5) Over in Chicago, the Center for Neighborhood Technology (CNT) is a low-income community-based network. Early on, they learned the need to develop a scalable, replicable, and self-sustaining method to deliver high-speed, low cost Internet service that was revenue generating. The CNT now operates the Wireless Community Networks, focused on capacity-building using WiFi connections (802.11b) between four urban, suburban, and rural Illinois communities. (6)

These are key and current examples of recent and varied approaches using wireless technologies to promote greater Information and Communications Technologies (ICTs) development.   They focus on partnership, on novel uses of current and new technologies, and in some cases, on mammoth commitment of national resources as in China.

There is no doubt the world is growing fonder of innovative wireless applications. But each country has to foster an economic and social environment that will allow technological innovation to flourish. Human capacity-building is just as important as siting new cellular towers or matching venture capital to new entrepreneurial efforts.

By exploring some of the current trends in wireless telecommunications development, we can establish the context for current USG development policy goals and initiatives in this area.

I. The Case for Development of the ICT Sector

A question often heard in development circles is why should a poor or developing country focus limited resources on development of the ICT sector? Why should developing economies pursue this path?

In the new global economies, ICT capabilities and skills – or their lack --- help to determine a nation's ability to compete, its economic growth, and most important, its standard of living. Exhibit number one and two: the two largest world economies, the United States and China. As of December 2003, according to Dr. John Marburger, the Director of the United States Office and Science and Technology Policy in the White House, the U.S. ICT industry represents only 8 percent of all American

enterprises. However, this 8 percent produces 29 percent of U.S. exports, generates high-quality jobs, and contributes strongly to productivity growth across all economic sectors. It is estimated that 40 percent of U.S. productivity growth between 1995-2002 can be attributed to ICT. (7) As of January 2004, China's Ministry of Information Industries (MII) Vice Minister Lou Qinjian notes that ICT growth in China has generated 6 percent of China's Gross Domestic Product (GDP) growth. (8)

A growing recognition of the importance of ICT for economic and social growth led to the United Nations' (UN) call for two World Summits on the Information Society (WSIS). The "First Phase" of the WSIS took place December 10-12 in Geneva, Switzerland. There, participants from over 175 nations agreed on "the pressing need for universal ICT access and the widespread infrastructure on which it is founded. It [the need for universal access] also points to enabling environments as essential for wider technology access and use and underscores that strong capacity building efforts are needed to achieve universal access. The widespread availability of low-cost applications plus respect for multilingual, diverse and culturally appropriate content are endorsed as well." Such issues as intellectual property rights, the control and management of Internet infrastructure, ICT development financing, human rights and freedom of expression were also addressed. (9)

The Summit agreed on specific goals, such as "connecting all villages, schools, hospitals and governments with ICT by 2015 and ensuring that half of the world's people are within reach of ICT." The goals are linked to pursuit of the UN's Millenium goals, an effort to combat "poverty, disease, homelessness, environmental degradation and gender inequality." Summit participants recognized a "pressing need" for universal access to ICT and related infrastructure, while noting that "strong capacity building efforts are needed to achieve universal access." (10) Participants will meet again in 2005 to measure progress.

At the WSIS, the U.S. head of delegation, Dr. John Marburger noted three key principles that reflect the U.S. Government's broad ICT developmental goals. These goals are aimed at stimulating and cultivating science, skills, and business infrastructure. The first is that domestic policies must encourage investment in research and innovation. Supporting goals emphasize movement toward privatization of ICT services supply, that is elimination or reduction of government ownership, and introduction of

competitive supply models. To stimulate greater investment in infrastructure, governments must strive to create a stable and positive business and social environment.

Second, governments and the private sector must strive to invest in human capacity-building efforts, to best utilize ICTS and to share in their benefits. Workforces must be trained and well-educated to let the promise of ICTs flourish. Dr. Marburger noted that, "A vital communications infrastructure expresses the full range of cultural imagination, without the divisive barriers of censorship," striking a blow for freedom of expression and the lifting of control of Internet content worldwide.

Third, the intellectual property of innovators, content producers, and generally, consumers, must be protected or there will be insufficient trust in ICT products and services. Network security on a global scale informs part of this need – if no one can trust ICT products and services, there is no reason to keep building and producing them. (11)

These general policy goals inform all of our ICT development efforts.

II. The Case for Wireless

Text messaging, fixed wireless infrastructure, growth of third-generation technologies and applications, and now Wi-Fi connectivity—these are all trends found in the developing economies. In recent years, the influx and importance of wireless technologies for worldwide ICT growth is often measured by the percentage of fixed versus mobile subscribers in any given country. The International Telecommunication Union (ITU) closely tracks these figures. Since 2001, mobile subscribers have passed the 50 percent mark, with cellular mobile subscribers now standing at 51 percent of all telephone subscribers worldwide at year-end 2002. (12)

What is very revealing is to see what geographical regions have high cellular penetration levels: those regions with a high percentage of developing economies. See Table I. Some of the growth figures are staggering. China, considered a developing economy by many, expects 400 million mobile subscribers by 2005. (13) Uganda had 5,000 cellular subscribers in 1997, and 393,000 in 2002, for a compounded annual growth rate (CAGR) of 139.4 percent. Paraguay had 84,000 cellular subscribers in 1997, which grew to 1.7 million in 2002, at a CAGR of 81.7 percent. (14)
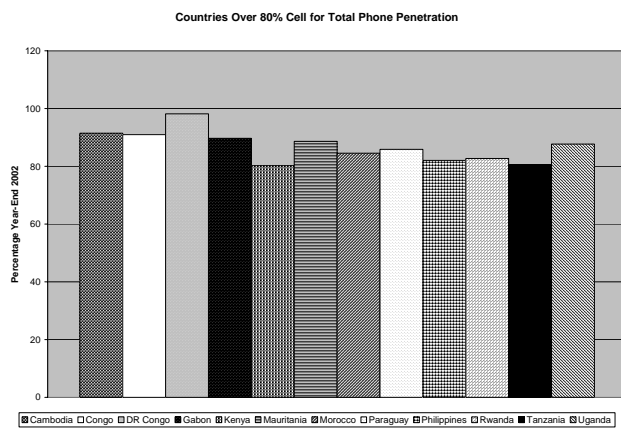
TABLE I: *Cellular Penetration Levels – World Regions*

Cellular Penetration Levels - World Regions
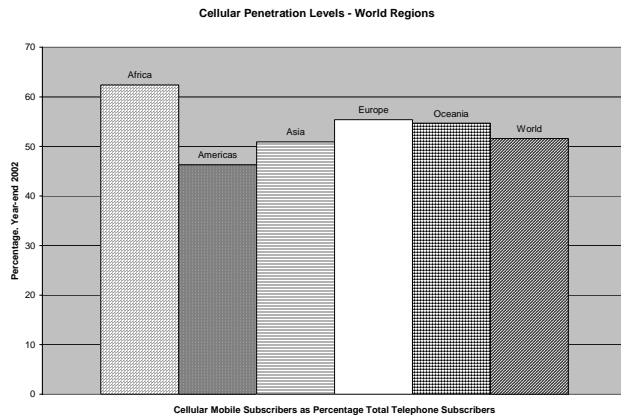
Source: ITU, December 2003.

Twelve countries have surpassed the 80th percentile for cellular subscribership as a percentage of total telephone subscribers. See Table II.

Table II: *Countries Over 80 Percent Cellular Subscribers as Percentage of Total Telephone Subscribership*

Countries Over 80% Cell for Total Phone Penetration

☑Cambodia ☐Congo ☐DR Congo ■Gabon ☑Kenya ▨Mauritania ☑Morocco ☐Paraguay ⊞Philippines ☑Rwanda ■Tanzania ☒Uganda

Source: ITU, December 2003.

But everything is not roses and poetry when it comes to deployment of wireless technologies in developing countries. In the case of WiFi, there are many grey areas in domestic laws in overseas markets. Some countries interpret new technologies such that, if it isn't banned, go ahead and pursue it.

More likely, though are cases such as Kenya (15) where if it a technology is not specifically allowed, or a frequency is not specifically allocated for licensing, it is forbidden. Such policies are often adopted by governments that are trying to protect legal monopoly and state-owned services providers. The U.S. Embassy in Albania notes that in Albania, "wireless technology is used only by those who can afford it, such as banks, government agencies, and international organizations. Today there are fewer than 50 clients that use this technology.…" (16) Since wireless is usually a less costly solution for connectivity needs, these examples underlies the issue of scalability, the need for regulatory reform and pro-competitive supply models.

In the case of Senegal, it is a grey area. An interagency team including technical experts from ITS, NIST and State have been working in recent months on a WiMAN (Wireless Metropolitan Access Network) project to see if it might take root in Senegal. However, under Senegalese law and policy, there are no legal specifications yet for WiFi or WiMAN provisioning. The U.S. Government and its U.S. AID contractors are now working with the new Senegalese regulatory body to address how best to pursue such technology-neutral development policies as the regulator oversees the introduction of competition into telecom services provisioning in 2004.

However, more and more regulators and policy-makers see the potential for wireless connectivity to promote Internet uptake. WiFi, WiMAN, whatever label you choose, the pundits foresee strong prospects. In July 2003, Pyramid Research forecast there will be 700 million WiFi users worldwide by 2008. (17) Clearly, countries will have to find novel ways to address the WiFi situation through appropriate policy and regulatory approaches.

III. Some Principles & Best Practices

The U.S. Government pursues a variety of paths on the pro-development agenda for ICTs. There are the traditional aid organizations and funding initiatives. Also, NTIA joins our colleagues in the State Department, the Federal Communications Commission, the U.S. Trade Representative's Office and the International Trade Administration to promote pro-competitive policy and regulatory reform around the world. We work in partnership with recipient countries, directly on a bilateral level, and jointly through multilateral and regional bodies,

establishing joint principles for action and best practices resources.

Following the 1998 ITU World Telecommunication Development Conference, NTIA became the rapporteur for a joint public-private sector effort to promote Internet access in developing countries. Participants performed a technology review and made recommendations to develop pro-competitive telecommunications policies and regulations. The result was the 2001 release of "*Promotion of Infrastructure and Use of the Internet In Developing Countries,*" better known as Study Question 13/1.

The report noted that many factors limit access to and use of the Internet, particularly in developing countries. These include restriction of ISPs and public Internet access points, restricted access to international gateways, insufficiency of Internet points of presence in rural and disadvantaged communities, inadequacy in advanced networking techniques, and regulatory policies that favor telephone monopolies. The technology review included such wireless options as: 1) VHF and UHF radio systems using narrow packet radio technology; 2) Global System for Mobiles (GSM400) using packet switching technology; 3)Time Division Multiple Access (TDMA) based on Point-To-Point (PTP) or Point-to- Multipoint (PMP) Radio Systems; 4) Code Division Multiple Access (CDMA) 450 MHZ; 5) Multipoint Multichannel Distribution System (MMDS); 6) Local Multipoint Distribution System (LMDS); 7) Very Small Aperture Terminals (VSAT),;and 8) Satellite Based Internet Access.

The U.S. Government has endorsed the policy recommendations advanced under Question 13/1, which include:

- Make leased lines available at reasonable cost and access charges for dial-up services affordable

- Enable submarine cable operators to obtain backhaul at competitive rates

- Promote satellite interconnection between ISPs

- Allow network providers to sell capacity directly to ISPs

- Lower custom tariffs and taxes on telecommunications equipment

- Promote private investment in telecommunications and Internet infrastructure

- Establish a consortium of public service institutions to contribute to Internet access, use and development

- Encourage the development of information strategies and models that facilitate community access

- Develop national programs to promote capacity building in Internet development and use, and the creation and dissemination of multicultural and multilingual Internet content. (18)

At the same time that the U.S. Government was pursuing Internet development policies at the ITU, we also worked with the 21-member Asia Pacific Economic Cooperation forum, or APEC. NTIA helped steer the APEC's Telecommunications and Information Working Group's (TEL) efforts to develop a Digital Divide Blueprint for Action, adopted in 2001. Approximately 12 APEC economies are considered developing economies (depending on one's view regarding China). As part of that effort, the TEL gained consensus on six policy principles to help improve Internet uptake and investment in new ICT technologies. These focus on:

- Leadership – noting governments should create national, regional, and local initiatives to create a vision and to develop institutions and structures to address issues;
- Partnerships – economies should work to create partnership between and among business, education, civil society, and government;
- Policy Coherence - governments should ensure that all policies (macroeconomic, social, educational, etc.) are working seamlessly to create the desired economic and social environment;
- Market Focus – governments are encouraged to promote pro-competitive equipment provisioning and services supply environments, to foster demand that can justify the investment required.
- Sustainability – all parties should work to ensure the continuation of initiatives and services beyond the seed money stage; and
- Scalability – designers of initiatives and projects should work to ensure that these

can be remodeled and replicated for other applications and geographic areas, especially under-served communities. (19)

In the Western Hemisphere, the U.S. Government works primarily with the Inter-American Telecommunications Commission, or CITEL, to promote a pro-development agenda. Under the auspices of the Organization of American States, the 35-member states of CITEL strive to make telecommunications a catalyst for the dynamic development of the Americas.

One of the CITEL's prime development activities is the release of "The Blue Book," or *"Telecommunication Policies for the Americas Region."* Released jointly by the ITU's Development Sector, the Blue Book gives a fresh perspective on best practices and provides a baseline for discussion on the impact of convergence and the Internet. There is a strong focus on legislative, policy and regulatory environments. Countries can avail themselves of the Blue Book as they think fit, in accordance with their own national public policy and juridical, administrative and social framework. The Bluebook is a dynamic instrument, subject to periodic review; a third edition is now under development. CITEL has also performed detailed studies on best practices, conducted jointly with the ITU's Development Sector, on Tele-Education, on Tele-Medicine, and on Universal Service. (20)

IV. The Digital Freedom Initiative

The U.S. Government's most recent effort to promote ICT development worldwide is through the Digital Freedom Initiative, or DFI. We are fast approaching the first anniversary of the DFI. In fact, it coincides with the ISART Conference, on March 4. The goal of the DFI is to promote economic growth by transferring ICT benefits to entrepreneurs and small businesses in the developing world. The DFI approach leverages the leadership of the U.S. Government with the creativity and resources of America's leading companies and the vision and energy of entrepreneurs. The first DFI effort was launched mid-year 2003 in Senegal, with new efforts underway in Peru in November 2003, and in Indonesia in January 2004. We expect an additional five countries to be named in 2004, and up to 20 countries by 2008.

DFI's implementation depends on an alliance between U.S. private sector companies, the U.S. Government, the host government, and the host private sector. The private sector is a key pillar of the DFI's sustainability. We strive to incorporate private sector strategic thinking and business savvy to develop replicable and scalable solutions.

The U.S. Government and especially NTIA are drawing upon its experiences in the ITU, APEC, CITEL and through bilateral experiences to inform the DFI process. In addition to the traditional aid agencies such as US AID, the Peace Corps, and the State Department, new DFI partners include the Federal Communications Commission, NTIA, and the International Trade Administration, all under the leadership of the U.S. Commerce Department's Technology Administration.

While we are in early days for Peru and Indonesia, we have done extensive design work in Senegal for three pilot projects. These pilots focus on improving productivity in Telecenters/Cybercafes, improving access to markets for Small and Medium-Sized Enterprises (SMEs) using ICT tools, and creating a supportive environment for micro-finance in a region where banking is centralized in a neighboring country. Recent successes include the inauguration of a Cisco Networking Academy in December 2003, and the formation of a new association to represent the views of the users community before the government, called SITSA (French acronym), the Senegalese equivalent of the Information Technology Association of America.

In terms of policy and regulatory development, U.S. agencies have worked closely with senior Senegalese policy officials, and a new Senegalese regulatory team, to complete draft decrees and undertake the legal legwork needed to bring a new legal framework to fruition. This new framework will guide the introduction of full competition into the Senegalese telecommunications market, where a privatized former state-owned enterprise still controls most telecommunications market segments. The United States also sponsored capacity-building workshops for the new regulatory team. The onus has now shifted to Senegal to announce its next steps to implement the new legal framework.

And as mentioned before, U.S. Government technical experts participating in the Senegal initiative are developing a feasibility study plan for next-generation wireless technology, to include 802.16 WIMAN technologies. U.S. participants note how well-suited wireless technologies are to accomplish the goals of DFI, offering greater connectivity at greatly reduced prices to both the builders and consumers of the service. The point-to-multipoint capabilities of wireless technologies over

diverse geographical areas and long distances make them attractive in Senegal. Our experts' objective is to develop costing models and a testbed that could then be replicated in additional DFI candidate countries in the future. First steps in Senegal include the use of WIMAN technology to connect an existing Wireless Internet Service Provider (WISP), or a traditional ISP or Internet café entrepreneur. Project participants would provide equipment and training as needed with the dual goals of extending connectivity while developing a more dense user base. Technical configurations and a business model will be developed jointly with local entrepreneurs to ensure sustainability and consistent service levels. The team will also work with the local regulator and incumbent operators to ensure there is truly a competitive environment and a supportive regulatory environment to allow WIMAN to flourish. Timeframes to implement the study are still under development.

To celebrate the DFI's first anniversary, the U.S. Department of Commerce's Under Secretary for Technology, Phillip Bond, plans to lead a delegation to Dakar, Senegal between March 8-12, 2004. Members of the DFI Business Roundtable will accompany him, demonstrating the joint public-private nature of the initiative.

V. Going Forward

Aside from further pursuit of myriad new activities under the DFI, the U.S. Government has other new ICT development activities.

At WSIS, the United States pledged US$400 million in grant money to support ICT development in developing countries. The U.S. Government's Overseas Private Investment Corporation (OPIC) has established a "support facility" to encourage U.S. investment in the sector, at a time when capital expenditures are down globally for ICT development. The grants will fund joint ventures between the public and private sectors in the 152 countries where OPIC operates. (21)

Also, collaboratively, the NTIA is chairing a new ITU effort to develop a best practices resource entitled "IP Policy Manual." The manual will advise ITU Member States on a variety of Internet issues such as domain names management. It has a particular focus on the needs and questions of developing countries.

NTIA continues to provide assistance to the reconstruction of Afghanistan and now Iraq. We have met with senior Afghani ministry officials to provide advice on implementation of their new development plans. In Iraq, we will shortly detail an NTIA wireless policy expert to assist in general telecommunications policy reform and reconstruction efforts. He will supplement the efforts of a current detailee from our spectrum management office, who is assisting on spectrum activities for the Coalition Provisional Authority. They are only an email away. Let's hope their Blackberries work over there.

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