

REGULATORY REFORM AND RURAL ROLL-OUT OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTs)

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Summary

Information and communication technologies or ICTs, are increasingly becoming an integral part of the way that modern society functions. ICTs can bring a wealth of benefits to rural and developing economies. Ubiquitous and cost-effective information infrastructure is therefore an essential element to modern economies. However, such infrastructure has been undersupplied in rural areas, leading to disparities in access to ICTs across rural and urban areas, known as the 'digital divide.' This article looks at the reasons for undersupply of rural information infrastructure, identifying and focusing on the key regulatory barriers to the expansion of rural access to ICTs, namely a lack of: transparent market entry; access to well managed scarce resources; fair and prompt interconnection and access; competent enforcement of competition and regulatory rules. The article then describes the required regulatory and policy solutions to enable their greater and more effective use.

1. Importance of Rural Access to Information and Communication Technologies

Information and communication technologies, or ICTs, are becoming increasingly important to the functioning of modern society. Many of the day-to-day activities of today's 'information society' rely on ICTs in one way or another, either directly through online banking transactions for example, or indirectly through services which rely on ICTs.

ICT infrastructure is therefore essential to modern society, constituting a foundational

stage in many value chains; good performance in ICTs yields even better performance up the value chain. All sectors are then able to become more efficient and competitive. This is not limited to information technology (IT) enabled services such as business process outsourcing.

Notwithstanding the importance of development priorities such as eliminating hunger, ensuring clean drinking water, etc., it must be recognized that ICTs make a contribution to socio-economic progress. ICTs can be instrumental in the alleviation of poverty; the Grameen village phone program that operates in Bangladesh illustrates this. Entrepreneurial women in rural Bangladeshi villages are provided with loans to purchase mobile phones, which are used as payphones by fellow villagers. Access to telephones not only helps poor villagers in Bangladesh to exchange price, business and health-related information but it has been estimated that on average the net income that can be made by the owner of the village phone can be as high as double the per capita GDP [gross domestic product] in Bangladesh.

Empirical evidence of the links between economic growth and development and information infrastructure can be found in the works of Hardy, Cronin, et al., Parker and Hudson et al. (see bibliography).

Uneven ICT infrastructure development, with less resources being put into rural infrastructure development leads to discrepancies in access to ICTs, known as the Digital Divide. Urban locations develop at a higher pace with greater access to ICTs, usually at lower costs. Underserved rural areas lag behind, if not stagnate. The digital divide exacerbates already existing socio-economic divides. It affects groups not only within countries (people living in rural areas, females, children, the elderly, the illiterate, etc) but also countries at varying stages of development. Figure 1 illustrates this divide; in 2004, low income countries had less than 10 telephones per 100 inhabitants on average, while high income countries had more than one telephone *per inhabitant* on average.

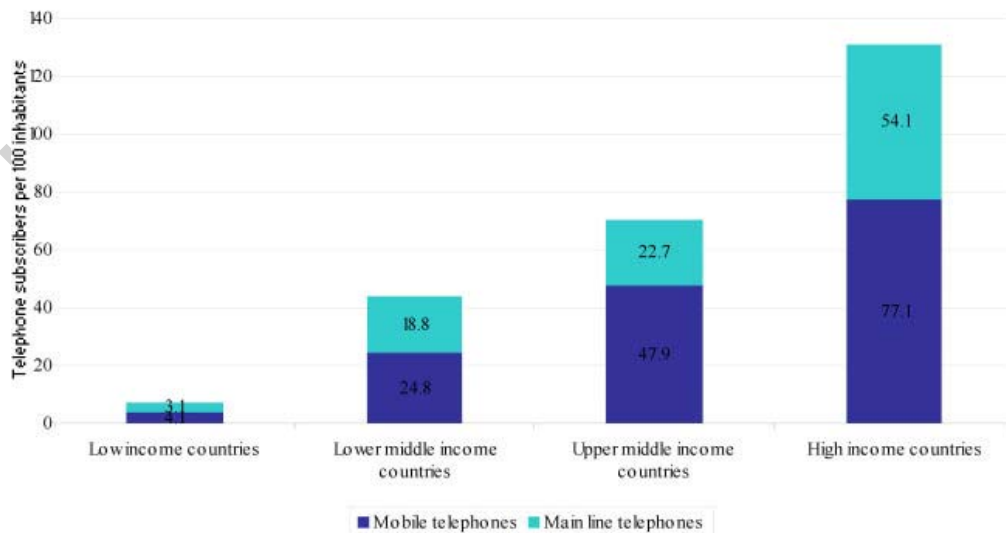


Figure 1. Telephone subscribers per hundred inhabitants, 2004. (Economies are grouped by 2004 United States dollar (USD) income levels: low, Gross National Income (GNI) per capita of USD 825 or less; lower middle, USD 826–3'255; upper middle, USD 3'256–10'065;

and high, USD 10'066 or more.

Source: ITU (2006) World Telecommunication/ICT Development Report 2006. Measuring ICT for Social And Economic Development

Modern, reliable and cost-effective infrastructure in rural areas can provide the catalyst needed for rural development. Domestic business process outsourcing (BPO) is one example. It can, because it does not rely on fluency in English or other foreign languages, provide opportunities for rural individuals (with basic high school education in most cases) to obtain employment within their localities, rather than migrating to urban job markets. BPOs mean higher wages and working conditions superior to those in government and most private-sector offices, which are scarce in rural areas anyway. For the rural youth, it provides a good foundation for a job elsewhere or for starting a business. More of the money that is earned is spent in rural areas where it is made, providing more business for local entrepreneurs and growth for the overall economy. Furthermore, BPOs allow rural areas to improve the productivity of agriculture by allowing the youth to move into higher-value-addition work. The resulting diversification of the rural economy is likely to dampen the boom and bust cycles of a pure agricultural economy.

An affordable, high-speed internet connection in a remote village or town does not just provide a point for villagers to access information on the Internet; it provides a highly effective conduit for communication and access to numerous services such as telemedicine, e-government, as well as access to agricultural information, which have been seen to improve rural livelihoods in many cases. In this manner, information infrastructure can provide solutions to many problems faced on an everyday basis in rural areas.

Facilitating rural-roll out of these technologies can enable socio-economic growth and development of remote, rural areas at a faster pace than otherwise. Furthermore, it is instrumental in achieving the WSIS [World Summit on the Information Society] vision of ensuring universal and affordable access to ICT infrastructure and ICT-enabled services. WSIS highlights the importance of closing the digital divide, improving access for marginalized groups of society, such as isolated rural communities.

2. Undersupply of Rural ICT Infrastructure

Telephony has generally been undersupplied in the rural context, let alone ICTs. Telecom penetration in several countries is growing because of rapidly proliferating mobile networks. The year 2001 saw mobile connectivity overtaking fixed connectivity on a global scale. Fixed penetration has begun to decline as a result of the slow down in investment in fixed, in favor of mobile networks. On the one hand people living in rural areas are gaining wider access to mobile telecommunication services, with value added services like Short Message Service (SMS), General Packet Radio Service (GPRS), and even transactional services, such as mobile banking which is gaining traction in parts of Africa as well as the Philippines. But on the other hand, the spread of mobile phones will not significantly increase rural access to the entire range of ICT and ICT-enabled services. While technology permits web-browsing on mobile phones, bandwidth is limited and costs to the individual user (handset costs as well as use charges) are high.

The cost of providing ICT services to rural areas is high due to the absence of reliable and affordable infrastructure. As long as cost-effective and reliable ICT infrastructure is absent (or limited) in these areas, access to modern ICTs and ICT-enabled services will be constrained.

The first step to identifying the causes for this undersupply of ICT connectivity to rural areas is to recognize that infrastructure providers, even incumbent operators, are rational; if they are not supplying infrastructure, there must be good reason.

The underlying factors that can be identified for undersupply can be summed up as follows:

1. Regulatory barriers and shortcomings that inhibit rural roll out
2. Prohibitively high costs of providing ICT infrastructure to rural areas
3. Service providers' perceptions of low economic demand (need as well as willingness to pay) in rural markets

This article focuses on the first factor but will briefly discuss the second and third factors too.

2.1. Regulatory Barriers and Shortcomings

ICT use, especially in developing countries, is often held back by laws and regulations. The legal and regulatory framework surrounding the ICT sector does not support the unconstrained use of ICTs for people to live their lives; they actively hinder them for the most part, and deter potential services providers particularly in rural areas.

Suboptimal or distorted regulatory and policy arrangements most often restrict, and even preclude the expansion of ICT service to underserved, rural areas. These arrangements prevent the exploitation of new low-cost technologies, such as Wi-Fi (IEEE 802.11x standard). Wi-Fi is ideally suited as an access technology for remote, rural areas. It is a very low-cost and convenient technology developed by multiple small manufacturers because the United States government chose to unregulate two bands of frequencies (2.4 GHz and 5.8GHz), also called the Industrial, Scientific and Medical (ISM) bands. Subject to minimal safeguards, people were free to do whatever they wanted in these bands. Today, almost every laptop that is manufactured has Wi-Fi capability built in. The equipment is cheap and ideal for extending rural ICTs, where purchasing power may be low. Although an increasing number of developing countries have taken steps to unlicense the WiFi frequencies (India, Indonesia, for example), they are regulated in many developing countries. In Sri Lanka, for example, the law requires operators to obtain a license for 'every frequency emitting apparatus' from the telecom regulator. Although some operators have managed to include Wi-Fi services within the scope of their licenses, the full potential of the service cannot be achieved unless the law is changed. Unlicensing or deregulation of this band (which many countries are beginning to do) would greatly reduce the cost of making use of this technology, allowing the cost to users to reflect the true cost of the technology, not arbitrary regulatory charges and transaction costs.

Similarly, low-cost telephony can also be availed of through VoIP [voice over Internet

protocol]; this is ideally suited for low-income rural populations, however VoIP remains illegal in some countries (e.g. the United Arab Emirates), to the extent that VoIP provider websites are blocked in some countries (e.g., Mexico, Panama). The main reason for the hostility towards VoIP is because legalizing it would undermine the profitability of international telephony provision by state-owned incumbents – in fact, in some countries VoIP is illegal to all operators other than the incumbent (e.g. Costa Rica). This is often the case in developing countries, where markets are less mature, and the incumbent monopolizes the international telephony market. Regardless, large grey markets are often seen to develop, with international calls bypassing the traditional telephone networks. Estimates of the size of the grey market in Africa, for example, are between one quarter and one third of international voice traffic. This causes large losses in revenue to legitimate operators. While legalizing VoIP brings along a series of policy and regulatory concerns (for example, the inability to connect to emergency services through VoIP) legalizing the technology would allow low-income rural users access to cheap telecom services; this is especially beneficial in countries with high migrant populations, such as the Philippines and Indonesia, with large numbers working in the Middle East as well as other parts of Asia, allowing family back home a low-cost means to keep in touch. Furthermore, legalizing VoIP – together with other enabling factors – provides operators who are considering rolling out rural broadband networks a better guarantee of revenue, justifying their investment.

In the case of WiFi, it must be emphasized that a backbone network to carry the traffic to and from the rural areas to a high-capacity conduit to the Internet is essential. This can be in the form of optical fiber, digital microwave or even satellite. The conduit need not be owned by the access provider; cost-oriented and non-discriminatory access to the existing backbone is probably the best. In the case of VoIP, both the underlying backbone and access networks must be in place. Of course, the operators will have to devise effective charging mechanisms to recover their costs.

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Biographical Sketches

Professor Rohan Samarajiva is chair and CEO of LIRNEasia. He is Chairman of the Lanka Software Foundation and serves on the Board of the Vanguard Foundation, the National Reawakening Council of Sarvodaya (Sri Lanka's leading Community Based Organization), and on the ICT Subcommittee of the Ceylon Chamber of Commerce. He is on the editorial boards of six academic journals, including the International Journal of Regulation and Governance and Telecommunications Policy and writes a regular column for www.lankabusinessonline.com. He is Guest Faculty at the TERI School of Advanced Studies, New Delhi.

From 2002 to 2004, Samarajiva assisted the government of Sri Lanka as Team Leader of the Public Interest Program Unit of the Ministry for Economic Reform, Science and Technology, where his responsibilities encompassed reforms in all infrastructure areas and included telecom reforms and the design of the e Sri Lanka Initiative. He was Director General of the Telecommunications Regulatory Commission in Sri Lanka (1998-1999), one of the founder directors of the ICT Agency of Sri Lanka (2003-2005), Associate Professor of Communication and Public Policy at the Ohio State University (1987-2000), and Visiting Professor of Economics of Infrastructures at the Delft University of Technology in the Netherlands (2000-2003).

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