

Report on the World Dialogue on Regulation

DIVERSIFYING PARTICIPATION

IN NETWORK DEVELOPMENT

Case studies and research from WDR Research Cycle 3



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Diversifying Participation in Network Development

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Edited by
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The World Dialogue on Regulation for Network Economies (WDR) facilitates an international dialogue to generate and disseminate new knowledge on frontier issues in regulation and governance to support the development of network economies. WDR is a project of LIRNE.NET.



Learning Initiatives on Reforms for Network Economies (LIRNE.NET) is an international network for research, training, policy and regulatory advice on telecom and information infrastructure reform and development.



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Introduction

William H. Melody

*Give a man a fish, you have fed him for a day;
Teach him how to fish, and you have fed him for a lifetime.*

This ancient Chinese parable is often used to demonstrate the greater importance of knowledge over more immediate and tangible gifts. But it is from a simpler time that is long past and is far from absolute, as an exposure of its tacit assumptions demonstrates.

A modern adaptation is *teach him how to fish, and you can sell him fishing equipment*. But can he afford fishing equipment, and does he know what fishing equipment to buy? Our newly trained fisherman must be able to afford fishing equipment, bait and maybe a boat, and to acquire additional specialised knowledge on how to use them effectively. He will need some specialised local knowledge on the swimming habits of different species of fish and the best locations and times for catching them. In modern parlance, he will need access to the appropriate technologies, skills to use them, and economic resources to be able to afford them. In today's world, information and communication technology (ICT) is used to track schools of fish by satellite for the benefit of those who can afford to buy this information and are capable of interpreting it and reacting in time to take advantage of it.

In addition, our new fisherman will need a fishing license, and fishing opportunities will be governed by the wisdom and effectiveness of local, national and international fishery policies and regulations. Thus, specialised knowledge, and often considerable managerial and political skill will be required to obtain scarce licenses, compete effectively with other fisherman, and to be heard on the policy and regulatory issues affecting one's fishing opportunities.

In reality, life for our new fisherman would be far more complicated than the parable suggests. And if he wished to sell some of his fish, further additional skills, resources and regulations would have to be mastered. But the lesson of the simple parable is still relevant. Training and knowledge enables people

to help themselves. But the knowledge and skill sets necessary to achieve success are often complex, multi-dimensional and interrelated. They involve important issues relating to technologies, policies and regulations, economic resources and their management. Knowledge and skill in only one area is usually insufficient to bring success, and coherence across technological, economic and policy/regulation issues is often necessary.

1.1 Designing Assistance Programs

The complexity and long-term nature of education, training and knowledge development programs create a degree of uncertainty about the end results of such programs. Benefits are seldom quantifiable with precision, or even measurable in the short-term, as the major benefits are realised much later, e.g., over a lifetime. But donors of aid and assistance typically require a clear quantifiable short-term result, e.g., a donated fish and a fed person, to judge effectiveness and decide future programs. This has led most donor aid priorities and programs to focus narrowly on trying to solve immediate, or topical, developing country issues, relying primarily on developed country expertise, rather than on long-term goals of teaching new knowledge and training in problem-solving skills.

Although these short-term programs often provide quantifiable short-term benefits, by implicitly rejecting the lesson of the parable they tend to foster dependency at the same time, thereby making long-term knowledge-building and enabling programs more difficult to implement. Some experts on this issue have concluded that the dependency relation is the primary result that completely overrides any short-term benefits from the substantive issues in aid projects. As Peter Bauer has

forcefully argued, the danger of aid is that it increases the power of government, leads to corruption, misallocates resources, and erodes civil society.¹ Yet the uncertainty of achieving positive results with long-term knowledge-building and enabling programs, which often lose focus and relevance, raises a serious risk that long-term programs may fail to achieve anything observable. This is perhaps the key reason that donor agencies are reluctant to support long-term knowledge development programs in a significant way.

However there can be synergy between short-term assistance and long-term institution building and empowerment. Both are necessary and neither is sufficient. It is not necessary to choose one type of aid program over the other. Rather, it is a matter of program design. If elements of training and knowledge generation are built into short-term assistance programs, and multiple short-term programs are coordinated over time, short-term programs can achieve long-term results as well. If timely and relevant short-term issues are built into long-term knowledge development, education and training programs, this will help maintain focus, relevance and interest in the programs, and can achieve short-term results as well. This model of program assistance can achieve superior results to those focusing only on short or long-term issues. It is possible to teach fishing and provide fish in a single integrated program.

1.2 Learning Initiatives on Reforms for Network Economies (LIRNE.NET)

LIRNE.NET was established on this core principle of synergy between long-term learning and short-term problem solving. LIRNE.NET's mission has been to foster long-term knowledge development on issues of telecom reform and ICT sector development through research and training programs on the evolving frontier policy and regulatory issues in the field. LIRNE.NET uses frontier regulatory and policy issues as the primary knowledge areas for achieving several interrelated objectives, 1) informing policymakers and regulators; 2) building research and training capacity in developing country centres and networks; and 3) expanding opportunities for participation in ICT policy and regulatory processes. It does this primarily through its international network of independent ICT research centres and regional research networks, and its training programs for telecom and ICT regulators and policymakers, and other participants in policy and regulatory processes.

Finding financial support for this long-term agenda focusing on frontier ICT policy and regulatory issues has been difficult as this model is foreign to most aid agencies and assistance programs. It has been made possible by the continuing academic interest and university support at LIRNE.NET's founding universities in developed countries, support from *infoDev* for the **World Dialogue on Regulation (WDR)** website for its first six years of existence, and major research and dissemination support from IDRC for capacity building in devel-

oping country ICT centres and networks through research contributions and training programs.

As LIRNE.NET's agenda is focused on building and strengthening institutions, and their capabilities for informed participation in frontier ICT policy development and regulatory implementation processes, it has evolved along some clear lines of development. The LIRNE.NET global network of regional ICT research centres has steadily expanded, bringing continuously increasing participation of developing country centres and researchers. Through LIRNE.NET's WDR website, there has been continuously expanding participation in its world dialogue on frontier regulatory and policy issues. And through its research-based participation in the policy and regulatory debates and deliberations in many countries, especially developing countries, it has both informed ongoing policy and regulatory deliberations on current issues and attracted increasing participation from users and other affected organizations. Increasing participation in research on policy and regulatory issues, and in policy and regulatory processes has been our primary indicator of progress. At the same time, LIRNE.NET research has contributed to more informed participation, dialogue, and policy and regulatory decisions in many countries.

LIRNE.NET's locus and activities, including research, editing, website and program management have shifted from our developed to our developing country centres. The WDR dialogues are primarily about developing country issues. Participation in policy and regulatory deliberations in developing countries is now expanding beyond the narrow club of incumbent and private telecom operators, telecom regulators and specialists, to include new operators in both the public and private sectors, as well as civil society organisations that have a stake in the resulting policies and regulations. This year's WDR research report, **Diversifying Participation in Network Development**, documents this positive trend.

1.3 Diversifying Participation in Network Development

The underlying theme of the LIRNE.NET research programs associated with its World Dialogue on Regulation activities has been expanding the opportunities for informed participation available to developing country researchers, policymakers and regulators, users and potential users of ICT services, with particular reference to poor people without services. Peter Bauer described the basic idea a half century ago as follows,

I regard the extension of the range of choice, that is, an increase in the range of effective alternatives open to people, as the principal objective and criterion of economic development; and I judge a measure principally by its probable effects on the range of alternatives open to individuals... The acceptance of this objective means that I attach significance, meaning, and value to individual acts of choice and valuation... (Bauer and Yamey 1957).

The research from the recently completed WDR research cycle on diversifying participation in network development presented in this volume is organised around three themes that the research examines. The first, *Affordability and Use*, results from research projects directed to provide a better understanding of the demand for telecom and ICT services by poor people.

For most of its history telecom has been examined as an issue of supply. The challenge has been seen as supplying telecom capacity, with relatively little attention paid to demand. The conventional wisdom about the needs and demands of poor people was drawn primarily from the limited study of experience in developed countries. It was considered obvious that poor people would have to spend a lower percentage of their income on telecom services because of the requirement to spend a higher proportion on necessities such as food and shelter. Further, their usage would be minimal, and uneconomical, as it would have to be confined only to the most urgent and highly valued calls. Subsidy calculations and plans for the network development that would be provided were based on these assumptions. As a result national networks in developing countries have been poorly developed or left undeveloped because of the perceived enormous subsidy requirements and limited usage expectations.

These assumptions were built into the early development of mobile networks. But these networks were extended to cover many regions where poor people lived because subscribers in more developed regions of countries, where there was a degree of competition among mobile operators, desired service coverage when they travelled. When the prepayment option for mobile services was introduced for a niche higher priced sub-market of users in more developed areas, poor people saw opportunities that had not been seen by others and which completely contradicted the conventional wisdom.

Mobile service is priced considerably higher than fixed service, and prepaid is priced higher than subscription mobile service. But telecom service was possible in many poor areas whereas it had not been possible previously. The prepayment option permitted access whereas subscription services with deposit and credit reference requirements presented an insurmountable barrier. The prepaid option was at significantly higher prices, but the amount spent was under the direct control of the phone (or SIM card) owner. Calls could be restricted to high value purposes, but the phone could be shared with family and friends in communities, and calls could be received at no additional cost in most countries, thereby generating much more traffic and revenue than forecast. When the micro-finance innovation was added, the barrier of the high cost of purchasing a mobile phone by the poor was reduced, permitting an expansion of the poor's access to mobile service. And when traditional restrictions on retailing services were lifted, the poor could establish local markets trading in calling minutes on mobile phones.

Today the vast majority of mobile use throughout the world is prepaid and an ever-increasing proportion of users are peo-

ple, families and communities previously considered too poor to be provided with service economically. Most of these poor users are being served profitably, and where subsidies are required they are a fraction of the estimates calculated on the basis of the old conventional wisdom. The driving force behind the great expansion in prepaid mobile service to the poor has been the innovation of the poor once they were presented with options and choices that enabled them to participate in communication services and manage their usage and spending. The chapters in Section 1 document these developments from the perspective of case study experience and a critical assessment of both past and current statistical data sources.

Section 2, *Models to Extend Participation in Network Development*, looks beyond the conventional wisdom on how best to extend networks to un-served regions and people. It examines ways of overcoming the supply side barriers to network development, which has been severely constrained by policies restricting network development rights to national monopolies and self-serving monopolistic estimates of subsidy requirements. The chapters in Section 2 examine innovative models for extending participation in network development, case studies of experience with new participants in the network development process from both the public and private sectors, and the use of new models for financing, the use of subsidies and research network cooperation.

The innovations examined in Sections 1 and 2 became possible only when policies and regulations were changed to permit increased participation in the new ICT-based telecom environment. Section 3, *Regulatory and Information Practices*, recognizes the importance of policy and regulation in fostering or constraining participation in network development, and the importance of informed, progressive regulation as the key facilitator of continued progress. The chapters in this section are directed to issues that can increase the effectiveness of regulation in its new facilitation role in an environment of expanded participation in network development and in the regulatory process.

The chapters in this volume demonstrate that most of the conventional wisdom about, 1) the demand for communication services by the poor; 2) the best way to extend telecom networks to poor regions; and 3) the most appropriate policies and regulations for sector development, have been rendered obsolete. A new understanding must be developed on the basis of research grounded heavily on case studies of new participants in network development, innovative and experimental approaches to network development, new models of demand, supply and markets, and a new proactive facilitating role for regulation. These chapters provide significant contributions to several policy and regulation issues currently under consideration in many developing countries, and to the development of a better understanding the new ICT sector and its development that must guide future ICT policy and regulation. To return to our parable, they demonstrate that the fishing is not as simple as it used to be, but it is possible to teach fishing and to catch fish in the same activity, thus validating both objectives.

Notes

¹ See Peter T. Bauer's landmark works *Dissent on Development* (1972) and *The Development Frontier: Essays in Applied Economics* (1991).

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Section 1

Affordability and Use

What is the cost of connecting individuals to the network? What is the cost for individuals to buy-in to the information society? Despite the positive benefits telephony can have for economic development, many people in developing nations are unable to use network infrastructure due to different factors. Recent assessments estimate that 80% of the world is covered by a mobile signal. But, as discussed in Chapter 2 by **Claire Milne**, notions of universal service and universal access are underpinned by three components: availability, accessibility and affordability. In a post-privatisation context, operators may not offer affordable services, or indeed may not choose to service areas that are perceived as unprofitable.

In the ideal case, regulatory incentives or funds would promote network growth in the direction of underserved communities and to make telecom services more affordable for low income users. As Milne observes, the spread of mobiles has given rise to the perception that affordability is no longer an issue. However, there is growing evidence of high price elasticity of demand for telephone service in developing countries, which suggests that more adventurous pricing may reward operators. The growth of the mobile network worldwide during the past decade has achieved in expansion of access to the telecom network what years of universal service programs have failed to deliver. Mobile telephony has proven effective in developing economies because it is increasingly affordable and adaptable to different modes of ownership and use.

Further, communities and individuals adopt strategies to make the network accessible and affordable. The fact of poor use of mobile telecom infrastructure has actually altered the economics of telecom provision, resulting in pervasive low average revenue per user especially for the prepaid market segment. Prepaid cards, shared use of handsets, texting, ring-call-back, and micro-financing of service vendors are some of the strategies that make access to the telecom network affordable. It is these kinds of strategies that have made mobile telephony ubiquitous in countries that are still unable to provide adequate fixed-line infrastructure.

Once connected, how much do poor people actually use or value their connection to the network? This can be difficult information to ascertain, especially since phone usage may be inextricably intertwined with social values rather than simply correlated with how much it costs to make a call. ICT indicators overwhelmingly focus on infrastructure and connectivity – which is to say, how many phones are in use rather than who is using them for what. In the analysis and debates about the so-called information society and its impacts on developing societies throughout the world there is usually an excess of generalities and speculation about concrete effects that ICTs have on the everyday lives of people. Frequently, the discussion and analysis are based on very general statistics on the national number of computers or total figures for web pages, mobile phones or wireless hotspots in a specific area or for a particular group of users.

A more grounded analysis of the concrete place that the use of these technologies has in the everyday life of the inhabitants of these societies is needed to more deeply understand the place that ICTs occupy and how they can contribute to improving social inclusion, especially for the low income population. In Chapter 3, **Avanti Moonesinghe, Harsha de Silva, Neluka Silva and Ayoma Abeyseriya** examine perceptions of affordability amongst low-income telecom users and the effects of changes in service costs on their usage patterns. Their findings based on a survey conducted in India and Sri Lanka focus on a number of telecom related issues pertaining to the 'financially constrained' – here defined as those earning less than approximately USD 100 a month. Insight into demand side usage patterns is important for service offerings, and not surprisingly there is little information about financially constrained users because that sector of the market has not seemed to be very important or been perceived as sufficiently profitable by service providers.

Providing a micro analytical approach to assessing the reality of ICT use, in Chapter 4 **Sebastian Ureta** examines expenditure on communications by households in four developing countries – Albania, Mexico, Nepal and South Africa – during 2000-2003. The relative amount of household income that

families devote to communications is analysed for these countries first separately and then comparatively.

Beyond efforts to make access affordable, it is essential to allow for or to create conditions that provide opportunities for propoor adoption of ICT and alternative uses of network infrastructure. The final chapter in this section reports on a small and medium enterprise (SME) Survey carried out by **Steve Esselaar, Christoph Stork, Ali Ndiwalana and Mariama Deen-Swararray** of the Research ICT Africa network (RIA) in 14 African countries. The SME sector has an important role to play in the present and future economic development, poverty reduction and employment creation in developing economies. The report notes that the SME sector is the sector in which most of the world's poor people work. SME sector growth largely exceeds the average economic growth of national economies in many countries and contributes significantly to employment creation. At the same time, little is known about the impact of ICT on the SME-sector. Regulation is identified as the key issue to increase accessibility and affordability of ICT for the SME-sector. It is critical that governments accept that ICT costs can be reduced by establishing a regulatory environment that facilitates competition in the ICT sector.

Improving Affordability of Telecommunications: Cross-fertilisation between the developed and the developing world

Claire Milne¹

1. Introduction

This chapter outlines the exploratory project *Telecoms demand: Measures for improving affordability of telecommunications in developing countries*,² and discusses the implications of the project's findings, with reference to both developing and developed countries, and possible new research building on these foundations. The project focused on better understanding affordability as key to understanding telecom demand which, in turn, is central to sound business cases for investment and network development in developing countries. Patterns of expenditure on communications were investigated, with emphasis on variability by income group, and an initial toolkit of measures was developed that operators and regulators can use to improve affordability.

The ideas of universal service and universal access are widely seen as having three components: availability, accessibility and affordability. Recently availability (often termed access) has had most attention. Our focus was affordability. Within any set of income and price levels, marketing-oriented techniques can significantly improve affordability. They are relatively easy to deploy, and may lead to a 'win-win-win' situation for industry, consumers and regulators. Of course, exploiting marketing-oriented techniques should not detract from efforts to intensify competition, introduce lower cost technology and bring control of undertakings closer to communities.

Recent rapid growth of cellular service has brought phone service for the first time within physical reach of huge populations. And advances in technology, especially GSM, have both brought down costs and provided practical means to target affordable telephony packages accurately at almost everyone within coverage. Two key features of GSM underlie these con-

clusions: its cost structure, and its software-based service provision. Micro-prepay is especially significant. For most operators, it is technically and financially easy to deploy – arguments against it are mainly commercial.

The spread of mobiles has given rise to a perception that affordability is no longer an issue. The study shows that for large populations this is too simple a conclusion. There is growing evidence of high price elasticity of demand for telephone service in developing countries, which suggests that more adventurous pricing may reward operators. Our work shows common patterns across countries, which may warrant more research. There is uncertainty over the spending potential of lower income groups.

1.1 Use of the term 'affordability'

The word 'affordable' is in everyday use and generally understood, at least in the English language,³ as meaning "within a person's financial capacity." However, it is virtually absent from economics literature,⁴ where it is presumed that consumers will maximise their utility subject to overall budget constraints. Buying more of one good and less of another is understood as an expression of preference, rather than reflecting the feasibility of meeting basic needs. The literature on poverty tends to consider the capacity of overall income to meet overall needs, rather than the affordability of meeting specific needs (however, this field has originated the 'percentage of income' approach, explored further below).⁵

When the term arises in telecoms policy and regulation debates, those with an economics background tend rapidly to translate 'affordability' into 'sustainability'. Affordable service provision requires sufficient revenues to keep the provider in business. Hence, to be of use, the service must be sustained, normally by revenues, or in justified cases by external funding.

In the same vein, for technical practitioners or those with an engineering background, 'affordable' ends up meaning 'using low-cost technology'. Advances in technology are leading to communications solutions at ever lower costs, which if reflected in prices will improve affordability.

In marketing, there is an ease of use of 'affordability' as seen in advertisements assuring consumers that they can indeed afford the latest car, computer or appliance. Marketing practices segment the population, with the 'addressable market' consisting of those segments which can be reached by current distribution channels and can *afford* the goods or services at their proposed prices. It is a conceptually small jump from marketing lingo to political use, such as manifestos proclaiming affordable housing or health care for all.

In this study we do not assert a rigorous definition of the term 'affordability', but take a practical approach, based on the premises that:

- Whether or not a service is affordable to a particular household depends primarily on its price and the household's disposable income, although other marketing and user factors also have bearing, which we explore further.
- For telecoms, affordability is linked only loosely to the cost of providing the service. Problems arise if total industry revenues are inadequate to cover total costs, but it is normal practice for classes of users to contribute to revenues and

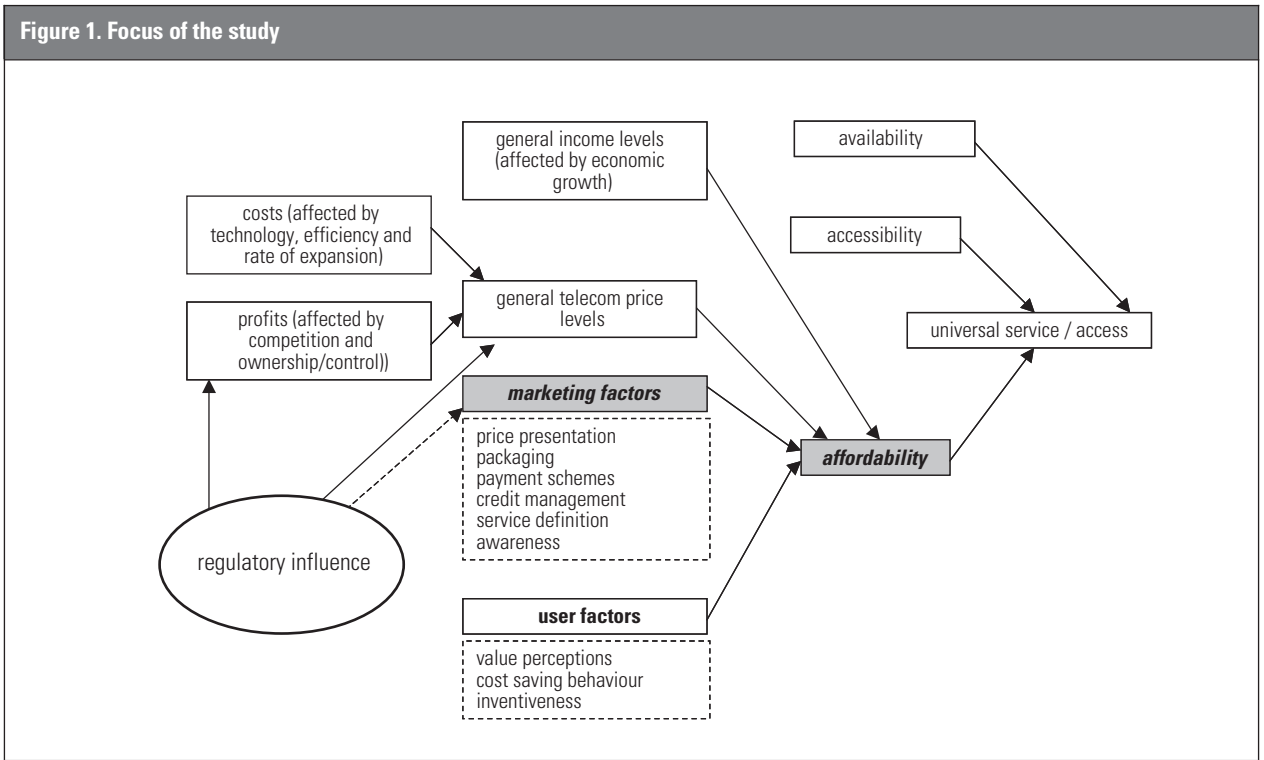
costs in different ways at different times. An affordable price may be below or above the cost of supply (text messages are a good example of the latter).

- Telephony can no longer be viewed as a luxury. In most countries, both the public and industry will benefit from extending affordable phone service widely to reach people in all income groups.

We distinguish two levels of affordability (or rather its lack), as determined by two effects:

- The 'barrier effect' prevents people from owning a phone or from using shared access phones other than in emergencies.
- The 'inhibitor effect' discourages people from making as many calls as they need in spite of having access to or owning a telephone.

The barrier effect of course is the more serious. However, recent surveys suggest that it is declining or absent in many contexts. We propose that affordability is only fully achieved when the inhibitor effect has been sufficiently reduced to allow for people to make all the calls they feel necessary, without cutting back on other essentials.



1.2 Focus and approach of the study

1.2.1 Aspects of universal service and universal access

Figure 1 sets out the scope and focus of our study. We start from the idea of *universal service and universal access*, which is widely seen as having three essential components:

- Availability – service can be obtained in a geographical area;
- Accessibility – service is accessible to differently abled people; and
- Affordability – telephone service is priced so that most people can afford it.⁶

Both universal service and universal access have these three components. The difference now usually drawn between them is that universal service means a private phone for every household, whereas universal access refers to reasonably convenient public or shared phones for everyone. The same policies promote progress towards both universal access and universal service, often seen as staged goals along a single path. We discuss this further in Section 5.1 below.

Our focus, affordability, is generally seen as contingent on two major influences:

- Overall income levels (which rise only slowly as a result of economic growth); and
- Overall telecom price levels (which are a function of actual costs and profits, both of which rightly attract much attention).

Higher incomes and lower overall price levels will eventually resolve most affordability issues for developing countries. But higher incomes depend on economic growth, which often takes decades to make a difference. Lower overall price levels can be brought about sooner, but are often hard to achieve because of both technical difficulties, such as those presented by geography and population distribution, and human resistance from vested interests.

We therefore highlight two other areas that affect affordability but receive less attention:

- Marketing factors (including tariff effects) for services for low income groups, such as price presentation, service packaging and payment options; and
- User factors, such as value perceptions and cost saving behaviour.

Given overall income and price levels, marketing factors can lead to valuable tools for improving affordability. Furthermore, these tools are relatively easy to deploy, sometimes even leading to a 'win-win-win' situation (industry gets more profits, consumers get more service and the regulator gets more praise). This chapter highlights the use of such tools for improving affordability. It goes without saying that their use should not detract from other relevant efforts to improve affordability, in particular by intensifying competition, intro-

ducing lower cost technology and bringing control of undertakings closer to consumers and communities.

The focus of this study is primarily on telephony (for the most part mobile, but also fixed) as a predominant underpinning of ICT development in all countries.

1.2.2 Relationship between access and affordability

The terms 'market efficiency gap' and 'access gap' came into use after their publication in a World Bank report on universal access (Dymond et al. 2000):

- A market efficiency gap refers to unserved markets, which are potentially commercially viable. Liberalisation (with a light and fair regulatory regime) should be sufficient to ensure that these markets will be served within a few years.
- An access gap refers to unserved markets, which are not commercially viable for the foreseeable future without external intervention, because of some combination of high cost (e.g. due to geographical factors), low population density and low incomes.

More recently, access gaps have been further differentiated:⁷

- The 'smart subsidy zone' refers to markets which could become commercially self-sustaining within a few years, if they receive initial support; and
- 'True access gaps' denote the remaining markets. Service provision in this instance is expected to require outside support indefinitely (for example, because continuing satellite bandwidth costs exceed what a small community can pay).

As also suggested by Galperin (2005), we feel that these useful concepts would be better renamed. The 'access gap' is more easily thought of as the 'affordability gap'. Modern technology is capable of providing access anywhere – the only problem is paying for it.

All these markets are geographic in nature. Universal access models focus on provision of some service in an area, often without specific penetration targets. Our focus is on how to increase penetration and use within areas that already have some service, or in other words, deepening the reach of universal access (in the direction of universal service) to complement its growing breadth.

Appropriate levels of universal service and universal access for a particular country will depend on its general level of development. We discuss this choice more fully in Section 5.1. This has been described⁸ in terms of suiting the policy for universal service and universal access to what the *country* can afford.

This study takes a neutral stance on government subsidies in the telecom sector in developing countries. It would be presumptuous to suggest that telecoms or ICT are more valuable than competing uses of scarce public funds. Addressing immediate and urgent needs *and* long-term important needs (such as ICT infrastructure) are complementary prongs in poverty alleviation. We note with interest the findings of Souter et al. in

Mozambique,⁹ where health clinics, schools, roads, and electricity were all rated much higher than mobile network coverage among respondents' preferences for investments. Only improved access to agricultural information was rated a little lower. Reliable water supply for irrigation and drinking is the top priority for innumerable poor communities around the world.

1.3 Recent relevant developments

This section briefly considers some recent developments that are useful to bear in mind before proceeding to our main analysis:

- The dramatic growth of wireless telephony around the world, fuelled by falling prices and prepaid;
- Business movements to market to low income customers and reduce regulation; and
- International activities (involving the International Telecommunication Union [ITU] and the World Bank) and the World Summit on the Information Society (WSIS) process.

1.3.1 Growth of wireless telephony

The main recent development underpinning this study is the dramatic growth in wireless telephony around the world. This growth is a product of new technology and the opening up of markets (even if opening is not yet full or complete).

It is well known that lift-off for mobile telephony has depended not only on lower prices but also, crucially, on the prepayment option successfully pioneered in Portugal and Italy and now accounting for a large majority of mobile subscribers worldwide. Prepaid plans can be structured in a variety of ways, but service providers quickly recognised that recurrent (usually monthly) standing charges were both unpopular and unnecessary.¹⁰ Features contributing to the success of prepaid include:

- Simple procedures for getting service, needing no credit check, bank account or proof of identity;¹¹
- Easy budgeting, with known outlay, all of which is usually available for making calls (for whatever duration is permitted).

The initial cost of a handset and high minimum credit recharge levels (relative to local incomes) have limited mobile ownership in the poorest countries to better-off groups. But use of mobile phones for individual calls has become widespread among non-owners wherever service is available. This sometimes happens on a formalised basis, as in the well-known Grameen Telecom initiative in Bangladesh.¹² Informal call resale by small entrepreneurs is now prevalent in many markets, as of course is non-commercial phone sharing among family, friends and acquaintances. This means that within mobile phone coverage, entry barriers to phone use have often been reduced to the price of a single call.

1.3.2 Business initiatives

Also in recent years, marketing to people with very limited purchasing power has become an accepted and often necessary business strategy. C.K. Prahalad's book on bottom of pyramid (BOP) techniques (Prahalad 2005) is the best known description of approaches that were already being adopted by many companies in emerging markets, and are now being followed by many more. The 'single serve' package of shampoo or sauce, typically bought occasionally by a daily paid worker for immediate consumption, has a close analogue in low denomination telephone account top-ups – enough only for a single call or text message. Websites such as <<http://www.nextbillion.net>> (under the auspices of the World Resources Institute) and the World Council for Sustainable Business Development <<http://www.wbcsd.org/>> provide a number of case studies documenting success stories in emerging markets.

The BOP movement is related to a more general corporate social responsibility (CSR) movement, which has also gained momentum in recent years. This in turn is linked to initiatives from business to resist and reduce what they see as excessive regulation. The telecom industry, and especially mobile operators, actively participate in all these arenas.

1.3.3 International activities and the World Summit on the Information Society (WSIS)

The ITU, in particular via its Telecommunication Development Bureau, plays a central role in advancing and spreading understanding of best practices in universal service and universal access. The 1998 ITU report on Universal Access¹³ is still one of the most widely quoted references on telecoms affordability. Although its more recent report on Universal Access (ITU 2003) contains less of substance on this topic, a chapter on minimum subsidy auctions by Edgardo Sepúlveda underlines its continuing importance:

Affordability assessment. The most critical demand-side factor is affordability. The USF administrator should collect data on individual or household expenditures on telecommunications and other services. Combined with income data (preferably by region and sub-region), this information will give the administrator a good idea of the current and expected affordability of telecommunication services in each region. The administrator can then better determine the required geographic and population coverage that may be required or feasible to contemplate. The affordability assessment should also take into account any potential change in consumer tariffs, for instance as a result of a consumer tariff rebalancing plan.

Following extensive debate, the ITU's latest index for measuring e-development, the Digital Opportunity Index (ITU 2005a), has 11 components of which two relate to affordability.¹⁴

Since 2001, the WSIS process has focused world attention on closing the digital divide and has generated a huge volume of documentation, including interesting new content, much of which has yet to be fully absorbed.

Business initiatives such as those described in the previous section have in part been met by moves from civil society, including the global consumer movement. When most consumers cannot or do not voice their own interests, survey research is particularly important for informing policymakers about consumers' situations and preferences. The next section looks at what we can learn about telecoms affordability from survey research

2. Assessing and measuring affordability

It is increasingly recognised¹⁵ that expanding access to telecoms (or ICT, or indeed other infrastructure) should be guided by survey research on people's needs and priorities, and also on demand and affordability assessments. This section considers how affordability of telecoms in developing countries can be assessed.

Affordability has been explored in the context of energy and water utilities.¹⁶ There is also some literature on measuring housing affordability in industrialised countries. Hulchanski (1995), for example, discusses the appropriateness of using the proportion of income spent on housing as an affordability measure for different purposes. A particularly interesting approach being piloted in the US assesses energy affordability using a special (short) household questionnaire to test for the presence or absence of certain effects of lack of affordable energy (Colton 2003; 2004). The survey findings can be applied to estimate threshold percentages of income at which energy should be regarded as unaffordable.

This section is arranged as follows:

- Section 2.1 discusses the main approaches being used for measuring and assessing affordability of telecoms;
- Section 2.2 presents the main findings of a new analysis of household expenditure surveys in four developing countries;
- Section 2.3 offers some conclusions on spending patterns from our study of consumer research, household expenditure surveys and other relevant literature; and
- Section 2.4 reviews findings of demand elasticity studies in developing countries.

2.1 Approaches to assessing affordability

Three main approaches are in use for measuring and assessing affordability of telecoms:

- Inference from telephone penetration statistics. We examine this approach in Section 2.1.1.
- Measurement of the percentage of income (or expenditure) devoted to telecoms. We discuss this approach in 2.1.2 and provide a new analysis of household expenditure surveys in 2.2. Annex D of Milne (2006) provides further relevant data from household expenditure surveys.

- Perceptions of affordability reported by users and potential users during field research on use of communications.

2.1.1 Penetration statistics

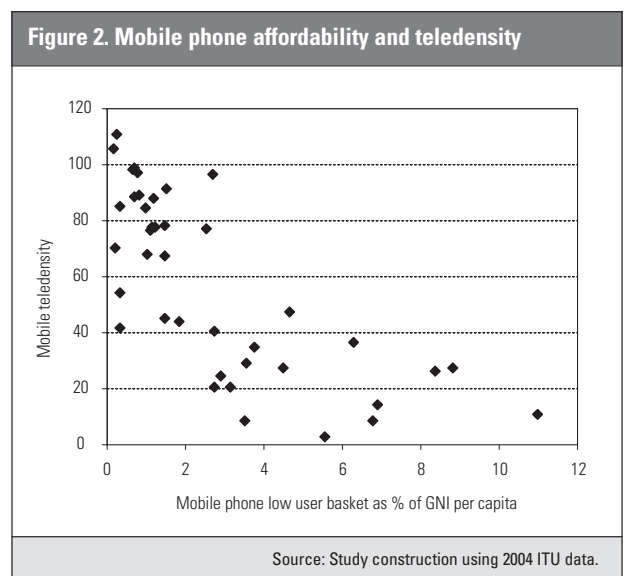
Affordability and penetration (take-up) are linked, but not in a straightforward way. The 1998 ITU report on Universal Access includes a figure¹⁷ plotting household penetration against the price of a basic basket of telephone service as a percentage of household consumption. This showed that in countries with household penetration over 80%, basic service basket costs did not exceed 2.5% of household expenditures. Conversely, basket costs above 5% of household consumption were associated with penetrations of below 20%.

Kuhlmann (1999) follows the same approach as the 1998 ITU report. In a more detailed look at Mexico, he showed that 80% of households could afford basic service (without long distance) if they spent 4.5% of income at current prices. The full basket, including an allowance of long distance calls, cost 14.2%.

Although the 1998 picture is now only of historic interest, we find the current picture for mobile is very similar. Figure 2 constructed along the lines of the 1998 ITU figure uses 2004 data¹⁸ for mobile rather than fixed service. The general appearance of this figure is much the same as the 1998 figure – we see the same downward slope (with plenty of scatter), and the same limit of 2.5% of spending for teledensities of 80% and over.¹⁹

A telephone service affordability target of 0.7% of income has been quoted in some works on universal service. This appears to have originated in the following quotation, in the context of the US during the mid-1990s:

[W]e have observed across time that only when the cost of service drops to less than 1 percent of income in the aggregate does



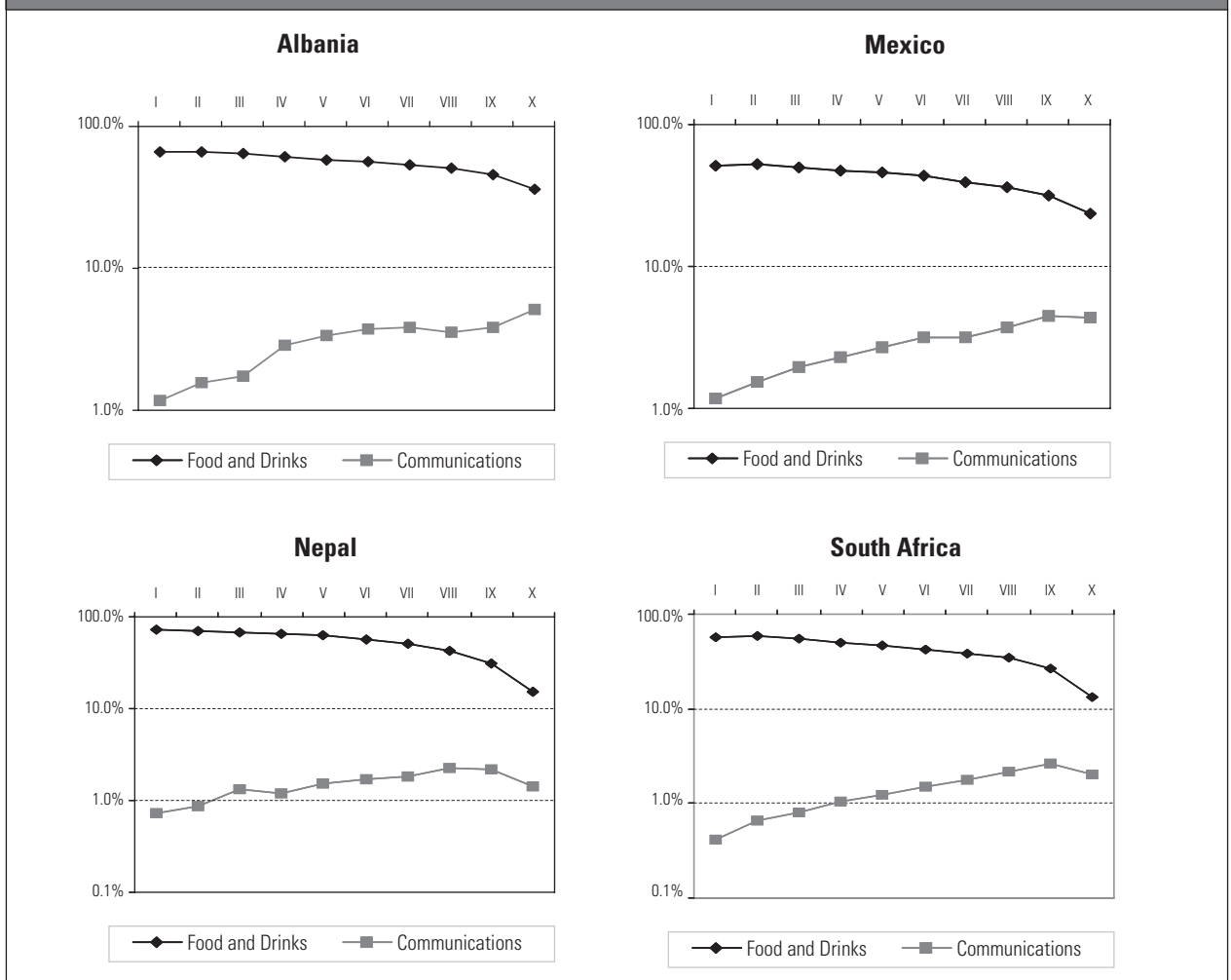
the telephone penetration rate begin to exceed 90 percent. Now we observe in a more disaggregated approach that penetration rates of 99 percent are consistently achieved only when the cost falls to less than 1 percent of income – to about 0.7 percent. Thus 0.7 percent of income would seem to be a target level for cost, if universal service is to be achieved (Cooper 1996).

Conversely, it has been argued that high levels of penetration imply universal affordability of service. This argument was used, for example, by the European Commission in its recent consultation on the scope of universal service. However, as shown by the Commission’s own market research (Ipsos 2004) the picture is much more complex. With respect to the 19% of EU15²⁰ households which do not have a mobile phone, affordability is identified as an obstacle for 16% of them overall, and for more in Portugal (40%) and Greece (26%). Affordability is

also a reason for not having a fixed telephone for 23% of the EU15 households without a fixed phone.

The relationship between percentage of income spent on basic service and penetration is susceptible to quantitative modelling. This enables assumptions to be clarified and the effect of changing input variables to be displayed. The first published application of this approach to telecom demand forecasting is in an early paper by Björn Wellenius (1970). More recently, similar techniques have been applied in investment analysis (for example, Morgan Stanley 2004). Milne (2000b) showed the significant differences brought about by different levels of inequality of income distribution (measured by the Gini coefficient) at any given average income level.

Figure 3. Spending on communications and food in four developing countries



Source: Study construction (Sebastian Ureta).

2.1.2 Percentage of income spent on communications

The percentage of income²¹ that people actually spend or are prepared to spend on communications is often used in measuring affordability, and in fact may itself be referred to as ‘affordability’ (for example by demand forecasters). In itself, however, such a percentage tells us nothing about user-perceived affordability. Spending 10% of income on a service may mean that the service is very highly valued (possibly, increasing well-being by substituting for other spending, say on transport), or equally that it is essential and highly priced (possibly, reducing well-being by displacing other desirable spending, say on food).

Further, affordability of communications must be considered in the broader context of other household expenses. Ureta (2005) looks for links between spending on communications and other spending categories, especially transport and ICTs. Possible substitution between transport and communications spending is discussed further in Section 2.3.5. Another grouping that has had some attention is that of utilities (usually water and sanitation, electricity and gas; now increasingly also telecoms). The percentage of income approach has been used in World Bank circles for assessing affordability of utilities when reforming infrastructure sectors, especially in Latin America.²² A figure of 15% of income for combined household utilities (water, energy and communications) has been taken as a rough affordability indicator, based on various household spending surveys. It is important to note that telecoms access (and consequently expenditure) tends to lag well behind access to other utilities (see for example Arneberg and Pederesen 2001; and Komives et al. 2001).

An assumption that between 2% and 3% of household spending is devoted to communications has been current for some time,²³ although the 1998 ITU Universal Access report referred to a figure of 5% as realistic. This study examined relevant data in detail to see if the rule should be changed. This is important for two reasons:

- Business cases may be based on revenue streams forecast using these factors; and
- This percentage (or often a higher one) applied to all income groups influences regulators’ approaches to universal service and universal access in many countries.

Our study explored the relation between telecoms spending and household spending along three main avenues:

- A new analysis of household expenditure from Albania, Mexico, Nepal and South Africa, in search of relationships between communications spending and other variables (Ureta 2005). Its key findings are summarised in Section 2.2;
- A review of recent consumer research on use of telecoms in developing countries, which sheds light on perceptions of affordability as well as on amounts spent; and
- A collection of available relevant evidence from published household expenditure surveys.

The conclusions from these three avenues are presented in Section 2.3, drawing also on other sources.

2.2 New analysis of four household expenditure surveys

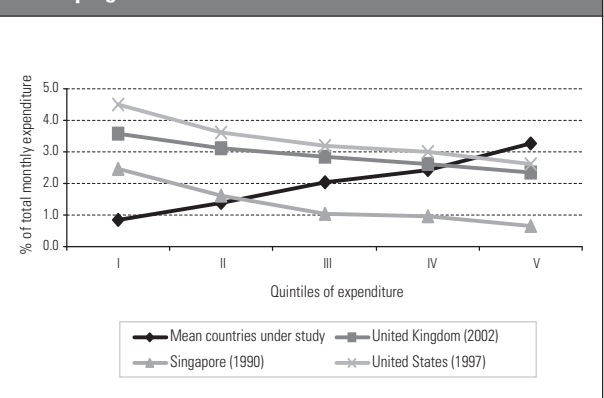
A major part of this study was a special analysis of household communications expenditure patterns in Albania, Mexico, Nepal and South Africa as revealed by existing household surveys.²⁴ The analysis investigated spending levels against different household characteristics (such as age, gender and level of education of household head, and location), and looked for relationships between communications expenditures and other categories of spending. A major finding was the very high level of variability in spending at the household level, despite the expected correlations with urban location and level of education.

Certain empirical regularities did however emerge, and these are summarised in Figures 3, 4 and 5. These illustrate how percentages of household spending vary as overall consumption level increases. Thus:

- Figure 3²⁵ demonstrates Engel’s law of food falling as a proportion of spending as households become better-off and shows this falling proportion of spending on food as mirrored by a rising proportion of spending on communications.
- Figure 4 contrasts the common pattern of household spending across our four study countries as compared with selected developed countries.
- Figure 5 presents a hypothetical synthesis of these patterns, taken over a larger group of income levels than is represented in any one country (note that the numbers on the left-hand scale are purely indicative).

It is tempting to speculate that the downturn in percentage household spending apparent in the top decile for Nepal and

Figure 4. Spending on communications in developed and developing countries



Source: Study construction (Sebastian Ureta).

South Africa in Figure 3 may be a turning point such as the one shown in Figure 5. However, it could also result from the particularly varied spending patterns of the top deciles in these countries, or simply from data problems. More investigation would be needed in order to find out.

2.3 Findings for spending patterns

2.3.1 Consumer research

The study reviewed findings of various demand surveys, mainly carried out on behalf of international organisations, with

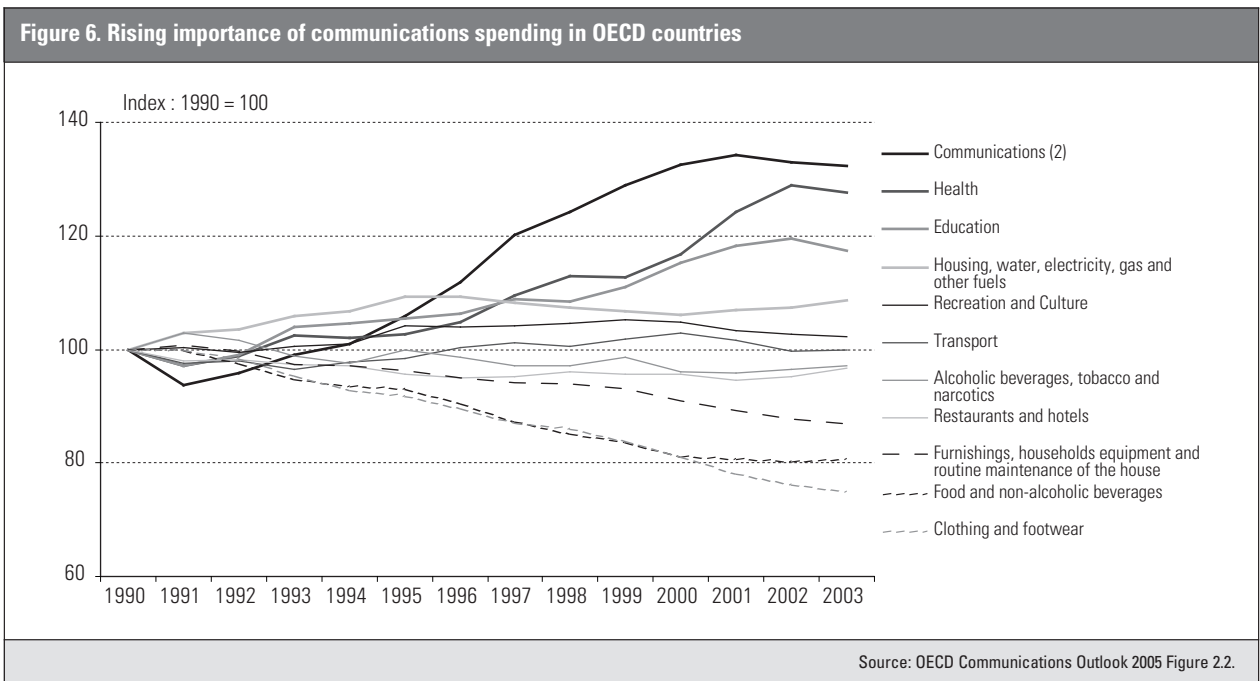
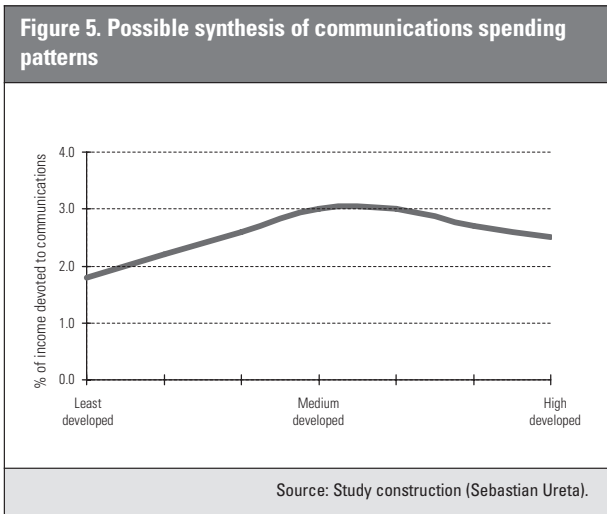
particular reference to user perceptions of affordability and percentage of income spent. In brief, it was found that:

- People making few calls often said they perceived phone service as being affordable, even at high call prices; but lower prices were expected to lead to far more calls; and
- The percentage of income spent on making phone calls appears to be growing over time, and to be higher among lower income groups (it is sometimes claimed to be higher than researchers found plausible).

2.3.2 Spending by low income groups

Most of the findings of these investigations are mutually supportive, but there is one area of apparent conflict. It is difficult to reconcile the findings of the household survey analysis, which shows the lowest income groups spending very little (whether absolutely or proportionately) on communications, with the findings of several recent specific surveys of telecoms demand which show a willingness to spend amounts in the region of 10% of income, even for the lowest income groups. As income elasticities for telecoms in developing countries are generally agreed to be greater than 1, the proportion spent by upper income groups should be higher still. The following are some possible explanations:

- Under-representation of the very poorest groups in the telecom demand surveys, possibly by design (as they may have little to say about telecoms), or through respondent self-withdrawal or interviewer bias.



- Over-statements in telecoms demand surveys of amounts being spent, or aspirations to spend not being borne out in reality. The household expenditure surveys are less prone to over-estimation of communications spending, since they give no special prominence to this over other types of spending.
- Differences in terms of what should be included in measurement of income, and varying accuracy in achieving this. In general, household expenditure surveys are better placed than demand surveys for accurately estimating income as they can (for example) allow for in-kind consumption and imputed rent.
- The household expenditure surveys are less recent than some of the demand surveys, and growth in cellular use is not yet reflected in them. The next round of surveys may more closely match the recent telecom demand surveys. Because of the volume of processing involved, publishing survey results often takes a year or more.
- Interview techniques affect answers. For example, in a Peruvian study (Gonzalez 2004), closed questions²⁶ about whether respondents would subscribe to service at certain prices led to results that were around four percentage points (or 15%) higher than open questions.
- At the same time as identifying service as affordable, many respondents also commented that they would make more calls if prices were lower. In other words, while initial barriers to using the service at all have been broken, price remains a significant inhibitor of use.
- Similarly, a preference for improved quality over decreased prices may point to poor service quality as much as to satisfaction with prices. Improved quality can also save money

as failed call attempts, dropped calls and low transmission quality all cost money in addition to being a nuisance.

Because the poorest groups (say, the lowest quintile or two) have such low incomes, even the highest estimates of their total communications spending account for only a small proportion of the total market, especially in very unequal societies.²⁷

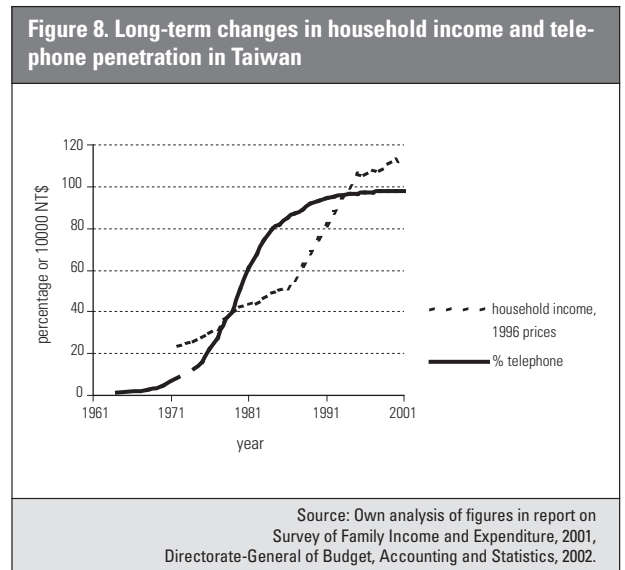
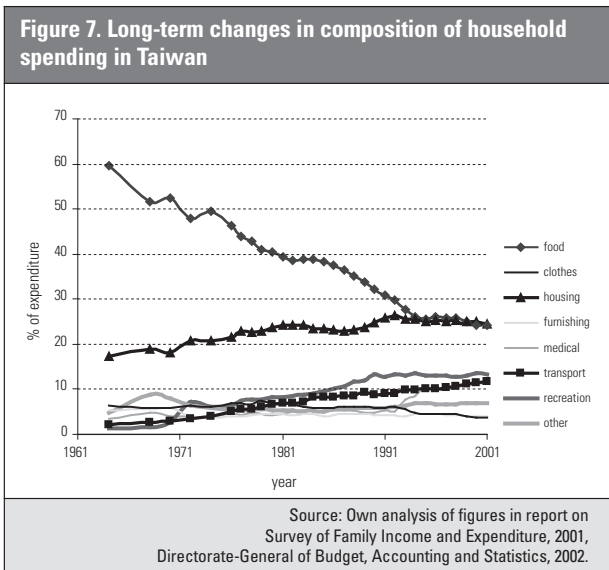
Even if their current spending is negligible, however, these people may still be of commercial interest. If they have access to a phone, they may well receive many more calls or messages than they send; and their future usage may be much larger than their current usage. Apart from commercial interest, most regulatory authorities are mandated with addressing the communications needs of all, including the lowest income groups.

2.3.3 Rise in importance of communications spending

The OECD has published evidence of a significant long-term rise in importance of communications spending by households relative to other types of spending in its member countries. This is shown in Figure 6.

Information like that for OECD countries is not generally available for developing countries. It is only recently that household surveys in developing countries have started to identify communications as a separate category – previously it was often aggregated with transport, and sometimes with housing and/or utility spending. However, the evidence available for this study suggests that there may be a similar trend in developing countries:

- Figure 7 shows changes in the composition of household spending in Taiwan over a 40-year period during which time it moved from developing to developed country status.



Here the transport spending category includes communications and has risen in importance.

- Figure 8 illustrates how household telephone penetration in Taiwan has grown following a classic S-curve, from 1.5% in 1964 to 98% in 2001. It is clear that the proportion of household budget devoted to communications spending must also have risen significantly during this critical transition phase.
- Other studies of international regularities in household consumption spending, notably by Selvanathan and Selvanathan show similar patterns in developing countries. For example, their work in Sri Lanka (2003) shows that the transport category rose from 6% of household spending in 1975 to 15% in 1995. In South Africa (2004) they find a less marked rise, from 12% in 1965 to 18% in 1995.
- In our study of statistical data from many countries, wherever we have comparable data from two periods for any country they show a rising trend. For example, the data from Chile show a rise from 1.4% to 2.9% in overall percentage spent on telecoms between 1987 and 1997, those from Lithuania an increase from 1% in 1996 to 2.7% in 1999, and the data from Bulgaria a rise from 0.9% in 1992 to 1.5% in 1998 (alongside an increase in teledensity from 27% to 32%).

We hypothesise that communications is rising everywhere as a percentage of household spending, and furthermore, that communications is rising as a percentage of household spending for all income groups. For lower income groups in developing countries, this increase is driven by new take-up of telephony. For higher income groups in developed countries, the increase is driven by new higher value applications. For intermediate income groups (those with higher incomes in developing countries and lower incomes in developed countries), price rebalancing and rising usage are also relevant factors.

2.3.4 From luxury to necessity

We observe the following apparent empirical regularities in patterns of spending by income/expenditure quintile:

- In industrialised countries, communications has the characteristics of a necessity (income elasticity less than 1) – the proportion of household spending devoted to communications decreases as total spending increases (although absolute spending increases).
- In developing countries, communications has the characteristics of a luxury (income elasticity greater than 1) – the proportion of household spending devoted to communications increases as total spending increases.
- Our data also include a few examples of middle income countries with fairly even spending patterns across income groups (Hungary 1997, Lithuania 2000, Cyprus 1980-1981).

The time and manner of transition between luxury and necessity states is unclear. The Selvanathans' (1994) study of transport and communications spending in Australia and the UK between 1960 and 1986 shows that during that period communications was still a luxury in the UK but had already become a necessity in Australia. Later UK data show that by the 1990s communications was a necessity in the UK.

Tying this together with the previous section suggests that:

- In developing countries, rising communications spending reflects the increasing availability of telecoms, its luxury status and rising prosperity (and in some cases, typically former communist countries, overall rising prices).
- The continuing rise in spending in industrialised countries, in spite of falling prices and communications having attained necessity status, reflects increasingly pervasive use (especially of Internet) and increasing substitution from other spending types, such as transport and entertainment.
- With rapid industry development, we may expect these industrialised country trends to be followed also in developing countries. There is anecdotal evidence of middle income people in these countries struggling to pay for using their mobile phones, which for them have become an 'essential luxury' or an 'expensive necessity'.

2.3.5 Transport substitution

The level of substitution from other sources remains unclear and deserves further study, since new and increased spending on communications by low income groups is often linked to supposed savings in other areas, especially transport. For example:

- The Vodafone study (Samuel et al. 2005) of mobile phone users in Tanzania and South Africa found 50% to 70% of respondents claiming that their mobiles led to large savings in travel time and/or cost. However, only 10% of small businesses in Egypt identified such benefits.
- Ureta's (2005) analysis of spending in four developing countries found no clear relationships between spending on communications and spending on transport or ICTs.
- Bertolini²⁸ also surveyed the relevant literature, and attempted to identify travel substitution benefits for a Ghana survey. The results of both exercises were inconclusive.
- The Selvanathans' (1994) study of transport and communications in Australia and the UK between 1960 and 1986 found positive pairwise substitutability of different sizes between public transport, private transport and communications.
- Souter et al. (2005) in Gujarat, Mozambique and Tanzania found some travel substitution, but also some additional spending. Asking respondents whether they were travelling much less, less, no change, more or much more in the last

two years (and weighting the proportions answering accordingly with scores -2, -1, 0, 1 and 2) led to mean scores of -0.7 for Gujarat, -0.2 for Mozambique and -0.3 for Tanzania – which indicate some overall saving. (These effects were not explicitly linked to using telephony but were on balance attributed to it.)

In developed countries, travel resulting from the use of ICTs has often been found to be as great as travel saved by ICTs.²⁹ There is no reason to expect the picture in developing countries to be less complex.

2.3.6 Summing up

Our overall conclusions from this area of study are:

- The percentage of household spending devoted to communications is highly variable, not only at the household level but also by social group and by country. It is also generally rising. The figures shown in our study may be indicative, but ideally each country should survey its own situation (and companies considering entering new markets would be well advised not to rely on global averages for forecasting purposes).
- There is particular uncertainty over the spending patterns of low income groups. Very low percentages found in some household expenditure surveys may be obsolete. On the other hand, very high percentages found by some recent telecom demand surveys may be biased towards higher telephone users and not apply uniformly across the groups in question. Although some households spend heavily at public telephones, higher spending levels are strongly related to phone ownership and may point to shared use by more than one household. Phone-owning households may be compensated for the use of their phone by people from non-owning households through forms of barter, which would rarely show up in surveys.³⁰

2.4 Elasticities of demand

Along with understanding current spending patterns and their relation to income (which may be described partly in terms of income elasticity of demand), a feel for the price elasticity of demand is important in designing tariff packages to meet specific objectives. Our study reviewed the growing body of evidence on price elasticity of demand in developing countries, from both formal studies and other sources.

Common sense suggests, and all the evidence supports the view, that the lower incomes prevalent in developing countries lead to greater price sensitivity and higher (that is, more negative) price elasticities of demand, at least once penetration starts to reach lower income groups. Numerical estimates of elasticities vary widely, both because of real differences among the populations studied and their circumstances, and for methodological reasons.

Overall, the significance of these findings is that price cuts may reward operators in terms of revenue and even profits, as

well as consumers. Regulators considering price levels need to be aware of elasticity effects.

We offer the following hypothesis, which is consistent with all the evidence reviewed.

When phone service is first available in a village, people from all income levels are willing to pay call prices measured in US dollars rather than cents. This is because the phone can save lives in emergencies, and can save money, for example on bus fares to town. Even people who live on a dollar a day will borrow, if they must, to make such calls. But the number of calls that fall into these 'essential' and 'money saving' categories is limited. This means that in the early days of call price reductions roughly the same number of calls will be made and overall revenues will fall – or in other words, price elasticity of demand is low.

With much cheaper service, however, a new range of applications for phone calls is likely to develop, including relationship maintenance, simple convenience and even (especially for young people) fun. Once call prices come within the range of daily spending money for lowest quartile households (typically, 10 cents [USD] or less for an entire call or message), and, importantly, payment mechanisms permit such spending to take place as and when people have those few cents in hand, usage volumes will greatly multiply. Price elasticity of demand will rise rapidly towards 1 (reflecting a fixed budget allowance for making calls) and may even exceed 1 for a period, as a proportion of the market that has some discretionary spending money chooses to divert it from small nonessentials (such as sweets or cigarettes) to phone calls.

3. Tools for improving affordability

This section considers ways in which service providers can improve affordability. We also discuss ways in which users themselves save on costs (Section 3.5) and how shared service (whether fixed or mobile) can help (Section 3.7).

In the world of fixed telephony, there has been a concern that special affordable tariffs designed to benefit restricted groups would also attract others (so-called free-riders), leading to unnecessary total cost. Two main approaches have been used to counter this: limiting eligibility for the tariffs (for example, to people in receipt of certain benefits) and limiting the allowed amount of usage at the special tariff.

The mobile world has altered this scenario. More precisely, we are speaking of the world of software-based service provision, of which modern mobile systems are the best current example. The variety of basic and value-added features that these systems permit is endless. An important development for affordability that we discuss in detail in Section 3.3 is micro-prepay. Further innovative approaches are described in Section 3.4.

These features provide great scope for designing affordable service packages whose take-up will be self-limiting because they are only attractive to a well-defined target market. For

example, special rates could be available only through individually prepaid over-the-air e-refills, and accounts using them could be made unable to take advantage of certain high-value content offers. The lifetime value of customers for the affordable packages can be maximised by upgrade offers. Going further, Chen and Pau (2004) foresee how affordable telecoms could be brought about in China by individual tariffs in a community context, using technology which already exists.

3.1 Mobile growth

The “mobile explosion” of the past decade is well documented. In 2002 world mobile connections overtook fixed lines, and they are likely to stay ahead for the indefinite future. What is less publicised is that the rate of mobile growth has been slowing. Markets in rich countries are reaching saturation (sometimes with more than 100 mobile connections per 100 people). In many poorer countries, however, large populations still remain eager for service, but affordability is now constraining take-up.

Over the past two years, partly in connection with the WSIS process, different stakeholder groups have been putting forward various points of view on the situation. For example:

- The GSM Association (GSMA), the premier trade body for cellular operators worldwide, has commissioned and sponsored a considerable body of work.³¹
- Vodafone has published its report *Africa: The Impact of Mobile Phones* (Samuel et al. 2005) and continues to sponsor research on related themes. The overall message is that the impact of mobile is highly positive for all social segments as well as for economies as a whole.

Table 1. Price of mobile ‘low user’ basket in USD per month, August 2005

Country	Price	Country	Price	Country	Price	Country	Price
Hong Kong	2.19	Turkey	6.59	Korea	14.06	Peru	22.41
India	2.51	Thailand	6.67	Venezuela	14.37	Brazil	23.52
China	3.67	Canada	7.34	South Africa	14.87	Germany	24.05
Indonesia	3.96	Poland	7.45	Sweden	15.63	Netherlands	24.62
Philippines	4.00	Israel	9.25	Czech Rep	16.66	Belgium	24.96
Taiwan	4.96	Argentina	9.96	Australia	18.34	Austria	26.51
Singapore	5.73	Colombia	10.37	UK	19.08	Japan	28.04
Egypt	5.77	USA	11.77	Chile	19.21	France	30.25
Malaysia	5.81	Hungary	13.76	Denmark	19.86	Switzerland	32.07
Russia	6.36	Italy	14.01	Spain	21.45	Mexico	33.17

Source: ITU 2005b.

- Mobile equipment suppliers are spreading the word that technological advance is making it possible for cellular service to be provided profitably almost anywhere, even in remote and poor rural areas of developing countries. Our study has focused on materials provided by Nokia, which has carried out quite large-scale market research. Recent publications by Ericsson and Alcatel also carry similar messages.
- Investment analysts continue to recommend many cellular companies in emerging markets as exciting growth stocks. They recognise the companies’ expansion into lower income market segments as both necessary and probably rewarding, with lower average revenue per user (ARPU)³² not necessarily meaning lower margins. They also warn, however, of dangers posed to investors by irrational competition (for example, a player stepping out of line on pricing).

3.2 Mobile prices and costs

The wide variation across countries of mobile pricing has attracted much comment. For example, Table 1 shows a factor of 15 between the lowest and highest prices for the same service basket in different countries. Given that the technology used is very similar, this naturally raises the question of whether some operators are charging too much, because of either inefficiency or excessive profits. Operators reject suggestions that their prices are too high, pointing to intense competition, difficulties in attracting investment and so forth. A fully informed view on this important issue requires access to information which only the operators possess, and which they regard as commercially confidential.

We reviewed a range of recent industry studies (including those mentioned above by the GSMA, Nokia, Alcatel, Ericsson and Vodafone). These confirmed our view that the technology exists to enable mobile service to be provided profitably in rural areas of developing countries – which implies affordable prices for a large number of if not most rural residents. If existing operators do not offer low priced service in rural areas, there is a clear case for offering these opportunities to other companies, including local start-ups with NGO or community support whose primary objective might be service rather than profit.

To help with modelling the costs of such opportunities, the WDR report (Milne 2006 Annex C) explored how reported costs vary between world regions and between network operators and how actual costs are likely to vary according to network use, geography and technology.

National level mobile pricing depends on many factors, among which the necessary cost of providing service is not dominant. The single largest factor is probably marketing strategy or ‘what the market will bear’, in the light of prices offered by fixed and other mobile operators. It is normal for mobile prices to start relatively high at service launch and subsequently decrease as better-off market segments become saturated, and as competition intensifies. To a significant extent,

operators can choose when and how to address less well-off segments.

The cost structure of mobile networks suggests considerable scope for operators to sell the use of spare capacity at low prices, to the benefit of low income users. Low off-peak call prices are familiar in fixed networks and just as applicable in mobile ones. More excitingly, unlike fixed networks, the marginal costs of a connection are close to zero once infrastructure is in place. This means that connections with very low outgoing revenue can be profitable, especially if they generate incoming revenue. Services based on short messaging (SMS) and USSD systems (such as text and voice messages, customer self-care, and reverse charging) have effectively zero usage cost, so any revenue they generate is pure profit.

This section has been largely premised in terms of GSM mobile services, which now account for a large and growing share of telecom connections, especially in the developing world. Two key features of GSM underlie the conclusions relating to affordability – its cost structure, and its software-based service provision. Similar arguments will also apply to other technologies that may share or surpass GSM's advantages in these two respects, such as CDMA.³³ They also apply to fixed wireless access using GSM and similar technologies. Hammond and Paul (2006) summarise current wireless technology options and costs.

An important disadvantage of GSM from the affordability viewpoint is its spectrum use, which limits the number of competitors and hence the amount of competition in many countries. More spectrum-efficient technologies which permit more open competition, and uses of currently vacant frequency bands, hold great promise, but it will take time for them to realise scale economies approaching those which GSM's spread has made possible.

3.3 Micro-prepay

Micro-prepay has been mentioned several times above. As a development that could have as big an impact for lower income groups as prepayment itself, we discuss it in more detail in this section.

Micro-prepay comes in various forms and different terms are in use, which we explain as follows:

- Micro-prepay is the ability to add small amounts of credit to a prepaid account; because physical vouchers and plastic cards cost a significant amount³⁴ to produce and distribute, micro-prepay usually relies on e-refill (which eliminates vouchers and cards).
- E-refill is the ability to add credit to a prepaid account without using physical vouchers or cards. It may take place in a face-to-face cash³⁵ transaction with an airtime dealer, or use over-the-air refill.
- Over-the-air-refill is the ability to add credit to a prepaid account remotely, using an electronic transaction capability. It relies on customers having access to another source of

electronic credit, which may be some kind of bank account or may be another customer's prepaid mobile account.

Micro-prepay may be made available only through dealers, in which case standard top-up denominations are pre-specified. In its most powerful form, customer-to-customer credit transfers of any size are allowed. The usual customer interface is a special SMS menu supported by software which can now be installed and integrated with an existing GSM system for around USD 1.2 million.

The pioneer of micro-prepay has been Smart Communications in the Philippines, which in the 2004 Philippines Long Distance Telephone Company (PLDT) Annual Report described how micro-prepay rapidly grew to account for a high proportion of credit reload, reduced churn and saved significant costs. A valuable source for more information on Smart's experience is Sharon Smith's case study (Smith 2004). This also highlights Smart's mobile banking services, the small business opportunities created by the Smart Load distribution system, and the important role of text messages in the Philippine mobile market, where they account for 50% of Smart's revenues from prepaid customers. (The popularity of text messages may depend on, among other factors, high literacy, use of a simple character set such as the Roman alphabet, and manual dexterity.)

The varying validity periods associated with low-value reloads or credit transfers are worth noting. Along with varying dealer commissions and credit transfer fees, these provide other dimensions for tailoring packages to target markets.

Other Asian countries where micro-prepay has been introduced include Indonesia, India and Thailand. Investment analysts have reacted enthusiastically to the phenomenon (see for example, Citigroup Smith Barney 2005; Morgan Stanley 2005).

According to Nokia (2005a), although e-refill has started in Asia, its success is not linked to special Asian factors and could be equally successful elsewhere, for example in Kenya, where a market study has taken place. However, Deutsche Bank (2005), considering micro-prepay prospects in Latin America, concluded that it is at least two years away, because:

- There is not enough spare network capacity to cater for the expanded market that micro-prepay would bring about;
- Subscriber numbers continue to grow steadily without needing a boost from micro-prepay (whereas in Asia, growth was starting to slow down);
- SMS is less popular in Latin America than in Asia, which reduces the attractiveness of micro-prepay (small top-ups can pay for several SMS or a single short voice call), especially as Latin American prepaid tariffs remain as high as one US dollar per minute;
- A Brazilian rule that operators must make universal service contributions based on their subscriber numbers is a disincentive to acquiring low-revenue subscribers; possible reg-

ulation of operators' disconnection procedures would be another disincentive.

Other reasons why operators might delay introducing e-refill or micro-prepay include:

- The initial investment could be a problem for a small or cash-strapped operator;
- There could be an adverse reaction from existing prepay voucher distributors;
- High penetration may already have been achieved (although the cost saving of abolishing physical vouchers may still make the move worthwhile); and
- There is a simple lack of interest on the part of management in serving the market segments to which micro-prepay will appeal.

From the viewpoint of affordability, we conclude that:

- Micro-prepay is a powerful and obvious tool for improving affordability;
- For most operators, it is technically and financially easy to deploy – arguments against it are mainly of a commercial nature;
- It will probably arrive in some form in most developing countries within the next few years – it only takes one operator to perceive a benefit from its introduction, and then others in the country will need to follow suit; and
- Regulators with a concern for affordability should discuss micro-prepay with their operators, and consider whether any regulatory barriers to its introduction can be lowered. If micro-prepay is not planned, regulators will want to understand why.

3.4 Other mobile innovations

3.4.1 A dynamic market

Because this is a dynamic market, any static collection of examples can be no more than a source of inspiration for a short time. A website for sharing such information on a continuing basis would be very useful. The following four sections provide a few examples of the variety of tools for affordability of mobile service.

3.4.2 Reducing initial payments

Low priced new phones (now less than USD 30) are being provided through the GSMA Emerging Market Handset Initiative. Another way to reduce this expense is to offer free handsets in return for a minimum monthly airtime for a year.

Microfinance and hire-purchase schemes allow customers to pay for handsets with manageable instalments. There are various microfinance initiatives. Grameen Telecom is a well-known example where the owner pays back an initial loan out of profits from selling phone calls. (These phones, specially

designed for robustness and to facilitate resale, are not, however, low priced.) Hire-purchase is a traditional way for people with low incomes to acquire durable goods and is used for mobile phones in parts of Latin America – with low risk for the lender, as the phone can be disconnected if an instalment is unpaid.

Second-hand and under-the-counter phones also have significant shares of the handset market. The GSMA taxation report³⁶ estimates black markets at 39% of the total handset market for all their study countries, varying regionally from 15% in the Asia-Pacific region to 66% in Central and Eastern Europe. Despite recent appeals for more recycling of electronic goods, it has been estimated that no more than 5% of discarded handsets from high income markets find their way to developing country markets, so there is ample room for growing competition between new and used handsets.

Separately available SIM cards, together with (often second-hand) SIM-unlocked phones, are a well-known low cost entry route to mobile subscription. The SIM cards themselves cost little enough to produce that they may be sold just for the nominal value of the initial calling credit they contain.

3.4.3 Reducing ongoing usage payments

Variable call tariffs, for example by time of day or by area, are familiar from traditional fixed network tariff structures but less common in mobile. Lower prices for on-net calls offer another dimension of variability that can be used creatively, whether by operators or by users (see Section 3.5).

A short charging unit (typically, per second charging) again is not new, but is not yet offered by all mobile operators. It is generally seen as enhancing affordability (even if it is introduced in a revenue-neutral way) because it removes the risk of notching up another whole minute's charge by speaking for just a little too long.

Earning airtime credit by receiving calls is now an option offered by some suppliers, for example in Australia and the UK.

3.4.4 Control of outgoings

Prepaid service itself is no longer an innovation, having been introduced more than a decade ago and already proved immensely successful in relatively low income markets. As already discussed, from the customer viewpoint it has two main advantages:

- Straightforward sign-up procedures with no need for a credit check or a bank account; and
- Easy budgeting, with no possibility of exceeding a known outlay.

It is also advantageous for operators, who save billing and collection costs and often benefit from paid-for but unused minutes.³⁷

Prepayment is much less suited to a tariff structure with continuing rental charges than to one where only usage is paid for.

The **expiry period of prepaid credit**, and the period during which an unused phone (or rather, SIM card) remains live, are important variables. The longer these are, the lower the minimum total cost of ownership becomes and the more light users will be recruited to a system. The shorter the validity of prepaid credit, the more like a rental it becomes.

Call price information is valuable for cost-conscious customers. Most operators allow prepaid customers to check their balance by a free call or SMS. Nokia's *prepaid tracker* service displays the price of the last call and the current balance on the handset.

SharedPhone is a South African initiative, also trading in Nigeria. Special phones include SIM cards with menus designed to make it easy for the owner to buy airtime from any supplier and resell it at his own chosen rates. It is marketed as "a business in your pocket."

3.4.5 Service innovations

Short Message Service (SMS) is another now familiar tool which itself can hardly be called an innovation. However, it is providing a route to many other innovative services (for example micro-prepay), as discussed above.

SMS are usually charged on a flat rate per message basis, regardless of the actual length of the message. The fact that the total cost of the message is known in advance enhances its affordability, in a similar way to prepaid.

SMS can remain a profitable service even with the actual level of this flat rate being extremely low. (Each message uses a tiny amount of system capacity compared with even a short voice call.) An allowance of free SMS can therefore be a useful promotional extra. Free 'call me' SMS (where any revenues are generated by the return call) are being offered in several countries.

Higher priced SMS can also be used as a payment mechanism for content or other value-added services. An interesting offer by Smart was fixed-price calls, where three or five minutes of talk time could be arranged in advance by an SMS charged at PHP 10 or 15 (18 or 27 cents [USD]), with an automatic cut-off after that time.

Audio messaging is a new service that will enable people to send voice messages in a similar way and for a similar cost to SMS text messages. This service has a special appeal for people with low literacy. As with SMS, once received, messages are stored in the handset, so they can be replayed any number of times without charge and even outside mobile coverage.

Mobile payment and banking services, while not in themselves directly enhancing affordability, are important new services that can add considerable value to a mobile phone subscription and help to justify its cost. These services are being developed especially in sub-Saharan Africa, where conventional banks and credit cards are scarce. Such services can be used for receiving remittances from relatives working in other countries, typically at much lower prices than alternative remittance services.

Push-to-talk (GSA 2005) is a new service being developed for groups of friends or colleagues who want to stay permanently switched-on to each other. Although initially planned as a high-value service for affluent markets, because it does not need simultaneous two-way transmission it will be low cost to provide, and could eventually be sold cheaply in developing countries. However, ultimately voice over IP (VoIP), with the encoding techniques used by 3G networks, should be at least as cost effective and more convenient.

Limited mobility services typically allow mobility only within a local area. The technology is almost identical to that used for full mobile services (and costs of service provision are correspondingly very similar). It is the service restriction that enables the offering to be positioned as a substitute for fixed service, and priced accordingly.

3.4.6 Marketing techniques

Any systematic marketing will start with a **market segmentation**. The Mobile Cooperation and Coordination Action report (MOCCA 2005) offers the following simple segmentation as a starting point for mobile services in developing countries across all world regions:

- The wealthy few for whom price is not an issue, who want the best available technology;
- The masses, or the large chunk of the population who are part of the formal economy. This segment can include workers in small offices or self-employed individuals such as plumbers, taxi drivers or carpenters. These people will generate a low ARPU and will need a low cost device with low cost airtime;
- People outside the formal economy, in remote areas or the very poor in towns and cities. They will need very low cost solutions and possibly shared usage services; and
- The government as a user of mobile and wireless services to reach the citizen.

Each segment needs quantification in each country, and can itself be further subdivided.

3.5 User cost saving behaviour

Many observers have noted the ingenuity and inventiveness with which new technologies are often used in developing countries. This section presents a few examples of cost saving behaviour in relation to phone use. The phenomenon could warrant further research, whose findings would be of interest to operators for service package design and to policymakers for insight into side-effects of policies.

A LIRNEasia (Zainudeen et al. 2006) research module carried out in Sri Lanka and India found a perhaps surprisingly low use of obvious cost saving strategies, given views expressed on tariff levels. Close to three-quarters of respondents are careful about local call durations, but only 19% of mobile users with access to fixed phones also use mobiles to receive mes-

sages but return calls on fixed lines. A third of mobile owners in the Sri Lankan sample make off-peak calls. The researchers suggest that low use of cost saving strategies is tied in with low overall use, with nearly all calls having a high importance to the user – so there is little room for discretion.

Qualitative researchers of mobile phone use in South Africa (Miller et al. 2005) report:

Mobile telephone ownership is high even amongst disadvantaged populations, 28% of the rural households interviewed owned a mobile phone, compared with 29% in the urban research context. Low incomes create an intricate dynamic between cheap ‘container’ phone outlets in urban areas or stand-alone commercial phones in rural areas and more expensive mobile phones. Typically calls are made at commercial phone points, whilst calls are received on mobile phones. Though making a call may mean a walk of 30 minutes to an hour in rural areas to the public access point, the small saving this generates is significant and makes it worth it.

The team researching Jamaica under the same overall research project report another cost saving usage pattern:

Most Jamaicans purchase prepaid phone cards, which they use to make a series of short calls (an average of 19 seconds). These short calls indicate to the recipient that they are remembered and thus sustains the connection until the time when there is a more specific reason to have more sustained contact, such as a visit to the person, a request for money or information or the establishment of a friendship or sexual relationship.

The Research ICT Africa! team (Gillwald 2005) report another common practice of the use of multiple SIM cards (which has the side-effect of artificially inflating subscriber numbers):

In some countries such as Cameroon, ... customers carry several SIM cards which are used interchangeably to reach colleagues and families on different lines to avoid exorbitant termination fees on different networks.

Many researchers report on the practice of ‘beeping’, which refers to using a pre-determined number of rings to convey a message to the recipient (such as “I am setting out for home now” or “please call me”) without incurring any charge. The Gamos/CTO team (2003) discuss the practice as observed in Botswana, Ghana and Uganda:

Overall, 38% of the total sample regularly beep, using public access points. 32% of the total sample beep from private providers, and 15% from booths, reflecting the overall preference for teleshops as a public point of access. The popularity of beeping is reflected in the “success rate” – the proportion of beeps returned to customers using both booths and telephone shops is similar, at 40%. The proportion of successful beeps made from personal mobile phones is slightly higher at 45%, but these people call back only 34% of people who beep them, confirming that people in rural and low income areas are less willing to pay for a call. ‘Beeping’ is particularly prevalent in Uganda because it requires

‘caller ID’ facilities which are available, effectively as standard, on the GSM phones which dominate that national market.

3.6 Higher fixed line rentals from tariff rebalancing

In some countries, relatively high take-up of fixed lines had already been achieved before the arrival of mobile. Where (as is often the case) line rentals are well below costs, rapid rebalancing to reflect costs can lead lower income customers to give up their lines. This is bad for the fixed line operator, which loses revenues without any significant corresponding reduction in short-run costs, and is bad for the customer if low priced mobile phones are not yet available in the area. Central and Eastern European and CIS countries are good examples of this state of affairs. David Townsend writing for the ITU³⁸ suggests that as part of tailoring more general approaches to the specific needs of this region:

[...]Targeted low-income financial support would be an appropriate policy option in these countries. In particular, as tariff rebalancing policies are implemented, there may be large numbers of long-term basic telephone service users who may be in jeopardy of dropping off the network. This would be directly contrary to universal service goals, even though rebalancing should ultimately encourage greater investment and market efficiency. Some form of subscribership stabilisation policy, through a combination of vouchers, subsidised tariffs, or “lifeline” services should be considered as a key component of both tariff and universal service policy.

Kočiško (2005), speaking from the viewpoint of the fixed line incumbent in Slovakia, makes the case that ‘hard’ rebalancing is no longer possible and must be replaced by ‘soft’ rebalancing (using optional calling plans, service upgrades and so on). Otherwise there is a risk of losing the fixed line network, when it is needed as part of the drive for broadband. Kumar and Singh (2000), addressing the fixed line rebalancing problem in India, recommend the use of a fund to decouple subsidies from cost-based tariffs (along with other regulatory actions).

Special fixed network tariffs for affordability may continue to be important in some countries with well-established fixed networks, especially among older people or others who prefer familiar fixed phones to mobiles.

3.7 Shared access

Modes of shared access include:

- Public payphones run by a phone company, where members of the public buy service a call at a time;
- Resale of fixed or mobile service on a commercial basis, normally by an individual who contracts service from an operator and sells calls to members of the public at a mark-up;
- Connections (fixed or mobile) shared formally by separate households, each of which has a direct relationship with the provider; and

- Informal sharing of fixed or mobile connections, where individual subscribers make their phones available to others to use on whatever terms they choose – possibly for payment, but often as a favour.

All these forms of sharing greatly improve affordability simply by making single calls available, without any regular outlay (or, in the case of formal shared service, with much reduced regular outlay). Compared with this advantage, the actual prices charged for calls are secondary, and receive little attention. As discussed in Section 2.4, however, high call prices may unnecessarily limit demand, especially in the medium term. Faced with high prices, people may restrict calling to cases of emergency and immediate economic gain, and fail to build habits of normal use.

In wealthy countries, public payphones have long been a staple universal service requirement, catering to the underprivileged few who have no home phone, as well as to people away from home. In recent years, increased use of mobile phones has severely undermined the revenue base for public payphones, and there is no long-term future for many unprofitable payphones.

In poor countries, demand for public and shared phone access is likely to continue increasing for the foreseeable future, catering for the many people who use the phone only occasionally. However, our review of consumer research and other evidence suggests that even among poor groups in poor countries, there are already widespread aspirations towards a phone per household. There are good reasons for this: a phone on the premises is clearly much more useful in emergencies, and much more convenient for receiving calls, than any shared access can be. As service availability broadens and phone take-up and use become accepted norms, we predict that a high proportion of households which perceive an 'own phone' as affordable will aim to acquire one.

3.7.1 Public payphones

Payphones have long been the staple of universal access provision. The pioneering universal access programmes pursued in Chile and Peru, and others which have built on such experience, have been framed in terms of a requirement to provide at least one public payphone in each unserved location. Public payphones are usually in independent structures (kiosks or shelters), unattended, with mechanisms for accepting either cash or cards. Their advantages may include relative privacy, any-time availability and regulated prices. Disadvantages for users tend to include lack of human support (making it hard to receive incoming calls), payment difficulties (such as faulty coin acceptance mechanisms or absence of local card retailer), and uncongenial surroundings.³⁹ From the supplier's viewpoint, payphones are costly to provide and maintain.

A useful benchmark price provided by Edgardo Sepulveda⁴⁰ is a public payphone tariff of 10 cents (USD) per minute. This has been found to be acceptable in Latin American communities with typical annual income levels of USD 500.

3.7.2 Commercial resale

A widespread alternative to public payphones is 'phone shops' offering phone calls on a small business basis. Telephony (and/or other communications, e.g. Internet or fax) may be the main business involved, or it may be simply a sideline, for example in a general store. Such businesses have been well-established in shop premises in developing countries wherever fixed lines have been available. Calls are sold at a (sometimes regulated) mark-up over what the proprietor pays to the operator.

The recent spread of mobile phones has engendered the 'phone shop' based on mobiles, for which there is a range of business models. At one end are purpose-designed mobile phones such as Grameen Telecom, or special SIM cards such as those in use for the South African SharedPhone, which may be provided from permanent or semi-permanent premises (such as a stall under a tree). At the other end is informal resale by itinerant vendors using their own ordinary handsets. Nokia's *prepaid tracker* service (displaying the price of each call, as mentioned in Section 3.4) would be a good tool for such informal resale.

The advantages and disadvantages for users of phone shops tend to be the opposite of those mentioned above for public payphones. What they lack in privacy they gain in convenience. They are lower-cost to provide and maintain than public payphones, and can more easily be added or extended to cater to growing demand. Typically, end-user prices are higher than those at public payphones, leaving a margin for the reseller.

3.7.3 Formal shared lines

The fixed 'party line' is a single exchange line shared between neighbours, each with an extension in their home and the ability to make and receive calls independently, but only when the line is not in use by someone else. Decades ago in developed countries, this was a common way to provide some service in the face of capacity shortages. In some countries with extensive fixed line infrastructure (such as Eastern Europe and the CIS or parts of Latin America) it is still a sensible expedient, with advantages for both the phone company and the subscribers involved, each of whom should pay only a part of the full line rental.

Similar formal sharing arrangements are possible for mobile handsets, but have not been developed as yet. For example, a single SIM card could cover several separate accounts each with its own telephone number (and distinctive ring tone). This would enable a group of people who work in the same place to share the initial cost of a single phone.

3.7.4 Informal shared lines

We have already commented in Section 3.5 above on users' inventiveness, and informal line sharing is another good example of this. At some risk of dubious legality or reliability, do-it-yourself domestic phone wiring can extend a single fixed exchange line around a group of dwellings, enabling both the

benefits and the costs to be shared. Friends may each have their own SIM card to use in a single shared mobile phone. As discussed above, simply allowing other people to use your phone (with or without payment or other form of reciprocity) is common practice where phones are scarce. Wirzenius (2002) explains how useful informal sharing can be, especially of mobile phones, with particular reference to Cambodia.

4. Regulatory actions

4.1 An overall approach for regulators

Telecom regulators in most countries are charged with responsibility for universal service and universal access, although some have gone much further than others in elaborating how to fulfil this responsibility. For regulators who are charged with improving affordability and have not yet worked out how to go about it, we offer the following suggestions:

- Study existing data, and where this is lacking consider carrying out new surveys, to understand users’ needs for telecom service availability, price and quality, and how far these needs are being met.
- Define and set targets for affordability based on these findings, after consulting user organisations, the industry and the public at large. Table 2 illustrates an approach to setting affordability targets that could be translated into prices, given a knowledge of income distribution and spending patterns (such as is provided by household surveys).
- Ensure that targets and relevant achievements are widely known. Support users and user groups in understanding their buying options and getting the best buy.
- Where achievements fall short of targets, discuss with the industry why this is; ensure that any regulatory barriers to progress (such as technology-based market entry restrictions, high licence fees or inequitable interconnection arrangements) are reduced as fast as practicable.
- If progress remains unsatisfactory, consider alternative approaches which may include:

1. Offering financial support for affordable service in particular areas or to particular social groups (the support should be awarded according to clear criteria).
2. Establishing specific obligations related to affordability on industry participants in ways that do not reduce or unbalance competition.
3. Ensuring that suitable groups representing community interests have the opportunity to take part in the provision of telecoms services in their areas.

Sections 4.2 and 4.3 include illustrations of approaches by regulators in different countries, as a source of interest and inspiration.

4.2 Regulators’ definitions of affordability

Many countries have an official policy of pursuing affordable telecoms but do not explicitly state what they mean by this, or how it is to be achieved. This subsection gives some examples of approaches to definition that different regulators have used.

4.2.1 USA: dictionary definition

In 1997 the US Federal Communications Commission discussed the definition of affordability as follows (FCC 1997: section V), based on looking in a dictionary:

The definition of affordability contains both:

- an absolute component (“to have enough or the means for”), which takes into account an individual’s means to subscribe to universal service, and
- a relative component (“to bear the cost of without serious detriment”), which takes into account whether consumers are spending a disproportionate amount of their income on telephone service.

The FCC reference goes on to look at the factors to be considered when assessing whether affordability has been achieved; besides the price of concessionary ‘Lifeline’ service and incomes, these include the size of the local calling area.

4.2.2 Bulgaria: an operational approach

Bulgaria has passed a regulation on affordability (CRC Bulgaria 2004). Its substance is similar to the approaches adopted by several EU15 members,⁴¹ in that affordability:

- Is not explicitly defined; instead the principles and specific measures for achieving it are given (as in, for example, the UK); and
- Is based on adjusting (by an amount related to inflation) the level of tariffs for low users existing at the date of the regulation (as in, for example, France).

4.2.3 South Africa: identifying needy groups

South Africa is unusual in having attempted to define affordability-related targets for both household-level and publicly accessible telephony (Universal Service Agency 1998). Con-

Country income bracket	Target percentage of households that can afford own phone	Target frequency of phone use that others can afford
Lower middle income country	90%	Weekly for lowest 10%
Low income country	60%	Weekly for 30%, monthly for lowest 10%
Very low income country	30%	Weekly for 50%, monthly for lowest 20%

Source: Study construction.

stant uncertainty about the legal framework and industry structure, and continually changing realities on the ground, have made it hard to conclude this long-running discussion. Mkhize (2003) presents the following affordability analysis of user categories:

- Group 1 – Users who can afford the national aggregate price and are supplied with telecoms services. (No subsidy needed.)
- Group 2 – Users who can afford the national aggregate price and are supplied with telecoms services, but in a high cost spatial location. (Operator needs subsidy.)
- Group 3 – Users who are supplied with telecoms services but cannot maintain and/or maximise their utilisation. (Users need support.) Support could be in the form of financial relief or customised customer premises equipment.
- Group 4 – Potential users currently lacking service and located throughout the country, and are unlikely to afford a telephone now or the foreseeable future. (Users need subsidy.)
- Group 5 – Potential users who can afford the national aggregate price but not currently supplied with requested telephone services. (Users do not need subsidy.)

4.2.4 Jordan: customer needs

The current proposed definition for an affordable tariff in Jordan (TRC Jordan 2005) is:

Relative to the monthly income of the lowest tenth percentile household group by income:

- (a) The initial payment, excluding the cost of the telephone handset, is no greater than 10% of monthly income.
- (b) The average monthly expenditure that is necessary to continue to make and receive calls is no greater than 2% of the monthly income.
- (c) The smallest payment increment for purchasing additional units of service is no greater than 5% of monthly income.

In addition, the tariff should be available without a check of the credit worthiness of the prospective subscriber.

This definition is notable for its degree of detail, for being framed in terms of customers' incomes, and for being based on market research. The research, carried out in 2004, included 2,500 interviews with household heads, both with and without phones, biased towards rural areas and low income groups.⁴²

4.3 Regulators' actions to help achieve affordability

As we have seen, some countries' definitions of affordability are implicit in their statement of how to go about improving it. In this section are some further examples of regulatory actions directly in support of affordability.

Of course, many other regulatory activities may indirectly influence affordability. The forms of liberalisation, interconnection arrangements, and licence conditions such as infrastructure sharing and roll-out targets are all important and relevant, and thoroughly discussed elsewhere. We do not explore them here,⁴³ other than to point to the significant potential contribution to revenues from better-off callers, often in cities or other countries, to worse-off recipients of calls. These can be formalised and legitimised as a 'network externality' (giving expression to the benefit to existing subscribers of new marginal subscribers joining the network). Such contributions commonly accrue to network operators through interconnect charging, but they may also appear as credits to the called party, who can then call more than he or she would otherwise have.

A related issue is calling-party-pays tariffs for calls to mobile phones. Many developing countries have changed from receiving-party-pays to calling-party-pays tariffs with positive effect on mobile penetration, because people with low incomes typically receive more calls than they make (and dislike being liable for charges for inbound calls that they cannot control). However, there are also arguments that receiving-party-pays tariffs are better longer term because they foster more calling from mobiles. Littlechild (2006) explores the topic and concludes that there is much to be said for a bill-and-keep interconnect solution.

There is considerable literature on the broader topic of universal service and universal access in developing countries, with widespread agreement on the advantages of liberalisation. Debate continues on how far market forces should be left to guide network roll-out and pricing, and when and how regulators should intervene to speed up the achievement of targets for universal service and universal access. Biggs (2003) provides a useful overview based on 18 country case studies, and concludes that government or regulatory involvement is necessary to ensure that important public priority groups are fully included in the benefits of telecommunications. By now, however, it is clear that (at any rate in low income countries) mobile operators must be an integral part of any solution.⁴⁴

4.3.1 Brazil: long prepaid card validity

In 2005, the Brazilian regulator Anatel required that the expiry period of a standard recharge card be extended from 90 days to 180 days. This is to be sold alongside a full range of cards with commercially determined expiry periods. This decision was debated in a public hearing and opposed by the operators, though supported by consumer groups.

4.3.2 India: 'tariff for life' consumer protection

Late in 2005, Indian operators began offering 'tariffs for life' for a single initial payment. The regulator quickly issued a consultation document (TRAI 2006a) on these tariffs, voicing concerns about whether they could constitute predatory pricing or undermine mobile number portability, as well as on what 'for life' should really mean. Its conclusions (TRAI 2006b) were focused on consumer protection aspects (clarity and soundness of the offers), with the other concerns set aside.

4.3.3 Ireland: consumer information

One action that all regulators may consider, irrespective of any actual intervention, is to inform consumers in simple language of how affordability is managed and what provisions exist to help them with phone costs. The Irish consumer website (www.askcomreg.ie) provides a good example of this. Other examples include the Pakistan Telecoms Authority's Consumer Awareness Bulletin and a similar initiative by the Tanzania Communications Regulatory Authority⁴⁵ which tabulates different providers' tariffs.

4.3.4 European Union: bill control

Universal service providers in the European Union may be required to provide not only special social tariffs but also bill control and payment features such as:

- Itemised billing
- Selective call barring for outgoing calls
- Prepayment systems
- Phased payment of connection fees
- Disconnection for non-payment of bills only after due warning.

4.3.5 Philippines: tariff menu

Heceta (2000) includes a proposal from the Philippines policy-maker for offering customers a range of fixed network tariffs with different charging approaches and payment mechanisms:

Type A: Current fixed monthly fee

Type B: Low monthly fee with per minute charge

Type C: Lower monthly fee with per call charge

Type D: Lower monthly fee with prepaid card

Type E: No monthly fee with per minute charge

Type F: No monthly fee with per call charge

Type G: No monthly fee with prepaid card

All plans to include an option with or without customer premise equipment and the prices reduce with the exclusion.

4.3.6 Jordan: reserve powers

The expectation in Jordan (TRC Jordan 2005) is that market forces will lead to affordable tariffs (as defined above). In case they do not, TRC has reserve powers to require them and a mechanism for compensating operators accordingly. Based on responses to the consultation, it seems likely that the final regulations will be similar to those in the draft. It also looks likely that affordable tariffs will be provided by the industry without the regulator needing to require them.⁴⁶

4.3.7 Jamaica: mobiles do the job

The outcome of the recent universal service consultation in Jamaica, which included consideration of affordability, is even more hands-off. The Office of Utilities Regulation (2004) concludes that the low minimum cost of ownership of mobile phones means that affordability is being achieved, and that no regulatory intervention is required.

5. Summing up and next steps

5.1 Stages of affordability

The staged model⁴⁷ of universal service and access policy has been accepted by many during the last decade. Because of fast-paced developments, various features of the model are now out of date, and the picture in one country may be a mixture of separate stages (in different areas or market sectors).

One of the biggest changes over this period has been the extent to which affordability is a realistic objective for universal service and access policy. This change is summarised in Table 3. Each stage of network development is now available to countries in a lower income bracket than was previously possible. Wide geographic reach (with teledensities of at least 10 per 100) is now thought to be achievable on a purely commercial basis even in low income countries like Nepal and Nigeria. Mass market take-up – the 'wall of demand' as private service comes within physical and financial reach of average households – is happening in lower middle income countries like Albania and the Philippines.

Previously, affordability considerations only started to enter the picture (usually implicitly) as part of pricing for mass market take-up in upper middle income countries, and appeared explicitly only in the context of home phone service for everyone at the network completion stage in high income countries.

As discussed above, during the past decade or so, telephone service has become much more prevalent, and service that is not just available but also affordable to everyone (whether on a dedicated or shared basis) has become an aspiration in very many countries. However, only few countries have developed clear statements of what they mean by affordable access for all. Table 3 suggests objectives that may be appropriate at the different stages, corresponding with national resources and the social importance that telephony has attained.

We believe that tools such as have been illustrated in our study can be used to achieve objectives of this kind, without

the need for funding from outside each country's ICT sector. Where affordability goals are demonstrably not achievable on a commercial basis, various shared universal service funding schemes, often originally devised for speeding up network roll-out, may be adapted to balance any unfair net cost burden. In many cases, no such device should be needed. In an open market environment, technological advances and far-sighted marketing strategy can do the job, with the regulator's role being one of oversight rather than intervention. Of course, in many countries there is still a long way to go before markets are open enough; but efforts to improve affordability can usefully proceed in parallel with market opening.

5.2 Implications for developed countries

Affordability of basic telecoms services has become a minority concern in developed countries. At the same time, in these countries the ability to use telecoms services at any time is of ever greater importance. As an illustration, two decades ago, the normal way to apply for a job was via a letter in the post. One decade ago, it was hard to apply for a job without having a convenient phone for calls both to and from potential employers. Now the job seeker without easy Internet access is at a serious disadvantage, and may actually be unable to apply for a range of positions. So it is vital to overcome any remaining problems related to affordability or access.

Traditional regulatory provisions for social tariffs have focused on fixed lines, but people in developed countries on low or irregular incomes are increasingly abandoning fixed lines for the flexibility of prepaid mobile phones. Prepayment eliminates bills and provides full user control of outgoing calls, both features which people on slim budgets tend to appreciate. What is more, for people who make little use of the phone, the relevant tariffs often reduce outgoings overall compared with a fixed line (relatively high call charges being offset by low or zero regular payments).

Pioneered in Western Europe, prepaid mobile has been taken up with enthusiasm practically all over the world. Now,

the bulk of growth in prepaid mobile is in developing countries, and this is where much innovation is happening. Many of the examples given in Sections 3.3 and 3.4 above could have useful applications in developed countries. For example:

- Over-the-air person-to-person credit transfers could be very popular for rescuing friends and family members when their call credit unexpectedly runs out.
- M-commerce (allowing small payments, such as parking fees, through mobile phones) is already arriving. Extensions to provide the equivalent of a basic bank account (permitting debits only against an adequate credit balance) are spreading in developing countries. These could be especially valuable to some groups in developed countries – for example, given suitable robust terminals, to elderly people who have traditionally preferred to use cash but now have difficulty getting out and about (and are not ready for Internet transactions).

Mobile operators and service providers, of course, will spread such innovations to developed countries as and when they are ready. Consumer awareness of possible new facilities, and requests for them, may help to speed their introduction.

5.3 Next steps and further work

The study overviewed a broad area. It has highlighted a number of specific topics where further work may be useful, interesting or both. For example:

- There is a large and growing body of developing country communications user research, much of which is relevant well beyond its immediate purpose. The study has only identified a small subset of findings from some of the available studies. A **catalogue of published communications user research**, outlining the topics and methodology of each item, would strengthen understanding of consumer demand and needs. It would also be a guide to where new work is most needed and how best to carry out new surveys.

Table 3. Changing match between economic level and network development

	Stage 1: Network establishment	Stage 2: Wide geographic reach	Stage 3: Mass market take-up	Stage 4: Network completion	Stage 5: Network enhancement
1998 income	Low	Lower middle	Upper middle	High	High
2005 income	Very low	Low	Lower middle	Upper middle	High
Importance of telephony	Alternatives to telephony still prevail (post, travel)	Status symbol also valued highly by poor for use in emergencies	Vital practical tool for majority	Phone access a social necessity	Individual access a social necessity
Affordability focus – shared access	Keep shared telephone access rates moderate	Reduce shared telephone access rates	Shared telephone access must be affordable to everyone	Shared telephone prices may rise as private access prevails	Shared telephones disappear as individual phones prevail
Affordability focus – private access*	Household phone packages target relatively well-off (q5)	Household phone packages target salaried workers (q5, q4)	Household phone packages target skilled workers (q4, q3, q2)	Household phone packages target low paid workers (q2, q1)	Broadband Internet access affordable to all who want it

* In this row, q5 to q1 stand for income quintiles (highest to lowest).

Source: Study construction.

Survey funders could encourage findings to be published and added to the catalogue.

- **Further analysis of household expenditure survey data** could throw useful light on common features of spending patterns across countries with similar characteristics, and in particular on the needs and capacities of low income groups.
- We do not know enough about **elasticity of demand in developing countries**. The study has shown that it is a mistake to rely on old findings from developed countries. New work should look at how demand can vary not just with income and price, but also with other factors such as the minimum outlay.
- More data on user needs and demand elasticities (preferably including time-series data following the same users over a number of years) would be valuable for several purposes. Among these would be more **rigorous quantitative demand modelling** (whose theoretical basis has yet to be developed).
- An authoritative published study of the **cost structure of wireless telecoms**, and how it is changing, would be of great value in promoting affordability.
- The study and others have pointed to a role for small enterprise, NGO and community participation in providing affordable communications. Such organisations may lack expertise in choosing the best technology for their application. An **impartial technical and business expert advice service** for them could make a real difference.
- International communications statistics (such as those collected and published by the ITU) should include suitable **affordability measurements for telephony**.
- A collection of **examples of innovative marketing** would be of great continuing value if expanded and updated. One possibility worth exploring would be a 'Wiki'-style open (but moderated) website that anyone could contribute to.

We draw attention also to the structured research agenda put forward by Parker et al (2005), which aims to improve understanding of how regulation can best support poverty reduction across all infrastructure sectors.

Notes

¹ Discussions with many colleagues are gratefully acknowledged. Arno Wirzenius of Teleplanning, David Lewin of Indepen, Trevor Kelsall of TelCom and Andrew Dymond of Intelecon deserve special thanks. The author alone is responsible for errors and omissions.

² Project directed by Professor Robin Mansell (Media and Communications Department at the London School of Economics), managed by Claire Milne, Visiting Researcher at LSE, and funded by IDRC as part of the LIRNE / World Dialogue on Regulation third research cycle. The full report of that project (Milne 2006) is available online at <<http://www.regulateonline.org/content/view/619/31/>>, where companion papers by Ureta, Varghese and Wheatley may also be found.

³ Linguistic differences (which may reflect cultural differences) make this slippery concept even harder to pin down in international discussions.

⁴ An exception in the area of housing is Hancock (1993). De Vos (1991) discusses economists' treatment of basic needs and minimum (subsistence) income.

⁵ In the UK, the idea of 'fuel poverty' (defined as needing to spend more than 10% of income to keep warm) is used to define affordability for fuel from its opposite. That is, people in fuel poverty are assumed to find fuel unaffordable.

⁶ The approach of Souter et al. (2005) effectively makes access contingent upon affordability, at the barrier level rather than at the inhibitor level: "Access is available when a citizen can use a public telephone facility within a reasonably convenient distance at a price which is affordable in comparison with the real and opportunity cost of alternatives (such as transport and postal services)."

⁷ Also by the World Bank and its advisors, especially Intelecon.

⁸ For example, in the Cullen International and WIK (2001) study of universal service in EU Accession Countries.

⁹ See Figure 3.2 of Souter et al. (2005: 61).

¹⁰ Unnecessary, given the cost structure of mobile networks, where (unlike fixed networks) minimal costs are incurred on behalf of marginal users who make few calls, so long as radio coverage is available in their area.

¹¹ In some countries, this potential strength is not allowed to be realised – identity checks are still required, generally for reasons associated with control of anti-social or criminal activities.

¹² See for example Grameen Technology Centre (2005).

¹³ ITU (1998) Chapter 2, Pricing Access, and especially 2.2, Defining Affordability.

¹⁴ These are the price of 20 hours Internet access, and the price of the OECD low user mobile basket, each as a percentage of per capita GNI.

¹⁵ For example, Kenny, Navas-Sabater and Qiang (2002) writing for the World Bank include a section called *Listening to the Poor* proposing the use of household surveys for these purposes.

¹⁶ For example, Milne (2004) provides an overview and references relevant to industrialised countries; Foster and others have considered electricity and water affordability especially in Latin America.

¹⁷ See Figure 2.6: Relative affordability and telephone access, which shows 1995 data for some 40 countries.

¹⁸ Again for 40 countries, taken from the ITU Digital Opportunity Index publication, June 2005.

¹⁹ The amount of usage in the two baskets is also similar – 830 calls in the 1998 fixed basket, and 660 (calls and SMS) in the 2004 mobile basket. Both axes now are scaled in relation to individuals, whereas on the 1998 figure both were scaled in relation to households. The 40 countries included in Figure 2 are the same as those listed in Table 1 (where actual basket prices for 2005 are shown).

²⁰ The EU15 countries are the first 15 member states of the European Union: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom.

²¹ Or, often and more or less equivalently, proportion of total expenditure.

²² See for example Foster, V. & Araujo, M. C. (2004); Foster, V. & CEER-UADE (2004). The WIDER infrastructure reform programme has also produced several relevant papers.

²³ An accessible reference to this (and to the scatter diagram of 1999 ITU data showing telecoms revenues as a percentage of GDP on which it is based) is Module 6 of the *Telecommunications Regulation Handbook* (Intven 2000).

²⁴ The four countries were chosen by the availability of household survey datasets under five years old that enable communications spending to be identified, and then for their broad geographic spread.

²⁵ Note the logarithmic scale in these graphs. The Roman numerals across each graph are deciles of total household expenditure.

²⁶ Closed questions permit only a limited range of answers (typically yes, no, don't know). Open questions permit the respondent to express himself or herself more freely.

²⁷ In a country with a Gini index of 0.6, the poorer 50% of the population account for only 18% of the spending – the same proportion that is spent by the lowest 25% in a country with a Gini index of 0.2.

²⁸ Bertolini (2002) section 2.3.2.2, ICTs and transportation; Section 5.2, Benefits from space and time bridging.

²⁹ See for example <<http://www.globaltelematics.com/>> for a North American view and <<http://www.flexibility.co.uk>> for a European one.

³⁰ Goodman (2005), when discussing the impact of mobile phones on social capital, refers to the 'network of reciprocity' associated with phone owners allowing non-owners to use their phones.

³¹ All GSMA material referred to is available on its website at <<http://www.gsmworld.com>>.

³² ARPU is a much-used conventional measure of company performance.

³³ In the bands used by mobile phones, lower frequency spectrum allows better radio propagation and hence fewer base stations, an important economy especially in areas of low revenue density. CDMA has often used 450MHz compared with the 900MHz or 1800 MHz typically used by GSM – see documents from the CDMA Development Group (CDG) at <<http://www.cdg.org>>. In late October 2005, both Nokia and Ericsson announced plans to produce GSM equipment suitable for the 450 MHz band during 2006.

³⁴ One estimate is an average of 20 cents (USD) per card.

³⁵ Or, where dealer and customer have a good personal relationship, short-term credit. See Sharon Smith's case study (2004).

³⁶ GSMA 2005, Exhibit 11.

³⁷ Sometimes known as the 'mustard effect' (supposedly, mustard manufacturers have made more money from the mustard sold but left unused than from mustard actually consumed).

³⁸ Annex 4, Universal Access/Service Challenges and Lessons from the CIS/CEE Region, David Townsend, in ITU (2003).

³⁹ These statements draw on several of the consumer research reports mentioned in Section 2.3.1 and in particular on Gamos and CTO, 2003.

⁴⁰ ITU (2003), Annex 3.

⁴¹ More detail on EU members' approaches and a history of BT's low user tariffs can be found in Milne (2000a).

⁴² David Hughes, Intercai Mondiale, personal communication, 18 November 2005.

⁴³ Useful information and viewpoints on these topics are provided by Wirzenius (2004) and Dymond (2004).

⁴⁴ The arguments have been well put by, for example, Wirzenius (2002) and Oestmann (2003).

⁴⁵ <http://www.pta.gov.pk/index.php?option=com_content&task=view&id=546&Itemid=565>

and <[http://www.tetra.go.tz/Market info/mobile tariffs.htm](http://www.tetra.go.tz/Market%20info/mobile%20tariffs.htm)>.

⁴⁶ David Hughes, Intercai Mondiale, personal communication, 18 November 2005.

⁴⁷ A form of this model was first published in Cave et al. (1994). A revised version benefited from discussion at the 1997 Telecoms Policy Research Conference before publication in 1998 in the form now drawn upon. See ITU (1998), which reproduced a similar table.

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Telecom Use on a Shoestring: Expenditure and perceptions of affordability amongst the financially constrained

Avanti Moonesinghe, Harsha de Silva, Neluka Silva & Ayoma Abeysuriya

1. Introduction

It is often claimed that access to telecommunication facilities is a propeller of economic prosperity in developing countries. Mobile phones in particular are considered pivotal in encouraging growth. Prahalad (2005) asserts that defining change in the world's poorest economies will be led by access to communications and not through the evolution of IT as was the case in the advanced countries of the world. A London Business School study reports that in a developing country, an increase of ten mobile phones per 100 people would boost GDP growth by 0.6 percentage points (Waverman et al. 2005). Despite the positive benefits of telephony, many people in developing nations are held back by a diverse set of factors – such as the lack of connectivity in rural locations, duties and taxes imposed by governments, cost of handsets and services. Having crossed the hurdle of access to communication, people in developing nations must still contend with the cost of services. Usage costs can play a large role in determining affordability and consequently the purposes and frequency of which people use phones.

Although the concept of affordability is understood at an intuitive level, it is difficult to define objectively, given “variation[s] in people’s needs as well as resources” and a “poor correlation between affordability and acquisition” (Milne 2003). Milne goes on to state that it is “widely accepted that basic telecoms should be affordable, but what this means in practice is rarely defined ([and] far less measured).” Affordability is determined by, *inter alia*, ability to pay a price without suffering hardship and by how much the good or service being bought is needed.

Recognising the problems associated with defining affordability, there is no doubt that costs associated with using these

services play a role in this variable. Milne (2006: 8) discerns two distinct levels of affordability (or rather the lack thereof). The lack of affordability can be understood in terms of a “barrier’ effect, which prevents people from owning a phone, or from using shared access phones other than in emergencies,” as well as an “inhibitor’ effect, which discourages people from making as many calls as needed even when they own or have access to a phone.” This study addresses the second level, affordability of telecom *services* (rather than affordability of acquiring a telephone). The perception of affordability amongst low income telecom users is examined based on a pilot study carried out in India and Sri Lanka during 2005. This study also examines perceived changes in behaviour resulting from changing prices.

Section 2 presents the background to the study and describes the methodology used. Section 3 examines the findings of the study, and considers means of access (i.e., fixed, mobile or public access telephones), the benefits of telecom access for those studied, expenditure on telecommunications and finally affordability of services and cost-related demand. Section 4 provides concluding remarks.

2. Background and methodology

This chapter draws on a subset of findings of a larger knowledge, attitude and practice study of the telecom usage patterns and behaviours of a sample of financially constrained users in eleven localities in India and Sri Lanka, entitled “Telecom use on a shoestring: A study of financially constrained people in South Asia.”¹

This chapter focuses on responses to two particular questions in the survey:

- a) How expensive do you find the cost of using the phone that you use, in general?
- b) If the cost of using the phone that you are using was reduced by half, how would you change the usage of your phone, in general?

In order to more fully understand the responses to these two questions, the following aspects were also considered:

- a) Mode(s) of communication the respondent used (fixed, mobile, public access²);
- b) Benefits received through access;
- c) Respondents' monthly communication expenditure.

Face-to-face interviews were conducted in both countries with a total of 3,199 respondents (India: 2,099; Sri Lanka: 1,100), using a primarily closed-ended questionnaire, which took on average 45 minutes to administer. The study was conducted during 2005, with data collection taking place in April and May of 2005. Seven localities were surveyed in India and four in Sri Lanka (see Table 1). With the exceptions of Mumbai (India) and Colombo (Sri Lanka), interviewees were spread across urban and rural areas of each locality. The questionnaire was translated into, and conducted in, five local languages (Hindi, Malayalam, Oriya, Sinhala and Tamil).

The fieldwork was conducted by a multinational market research company, which deployed its own team of trained enumerators in Sri Lanka and India. The field research team (20 interviewers, four supervisors and one field executive in Sri Lanka; 56 interviewers, 14 supervisors and five field executives in India) took part in training at the local offices. Some of the enumerators were originally from the locations where the study took place. A team consisted of a number of enumera-

tors and one supervisor who conducted fieldwork in an assigned location.

For the purposes of this study, 'financially constrained' is defined by two parameters: first, household income levels of approximately USD 100³ or less; second, through a measure of socio-economic classification. In Sri Lanka, those belonging to socio-economic classification⁴ (SEC) groups B, C, D or E were included in the sample. For the Indian sample, a different but comparable socio-economic classification is used. Socio-economic classification of the financially constrained in India, according to the natural distribution of population, is divided among urban and rural settings, each consisting of different SEC groups. For India, the urban financially constrained are classified as SEC B, C, D and E groups, and rural financially constrained are classified as R1, R2, R3 and R4, based on profession and type of dwelling⁵ of the chief wage earner. In this study, this division was followed for the socio-economic classification of Indian users.

'Users' were considered to be those having used a telephone in the preceding three months, either via a self or family-owned phone or a third party's phone.

Respondents were chosen from selected households⁶ based on KISH sampling techniques⁷ to ensure random sampling as well as adequate representation of gender and age groups as in their actually existing ratios.⁸

India and Sri Lanka are located in South Asia, the largest concentration of poor people in the world. Both countries have experienced rapid telecom growth during the past five years. It was hoped that this study would reveal differences, if any, in the use of telecoms amongst financially constrained users in the two environments. The seven different localities in India and the four in Sri Lanka were selected, not to obtain a representative sample of either of the two countries, but to capture the diversity *within* the two countries, taking snapshots of financially constrained users in eleven very different markets, in terms of telecoms access, economy, population and geography. For this purpose, the Indian sample was further divided into two regions for some of the analysis: Northern India (Dehradun, Gorakhpur and Neemuch) and Southern India (Cuttack, Kasargod, Mumbai and Sivaganga). The rationale for grouping the locations in this manner was the broad similarities in socio-economic qualities of the locations. This was done to preserve some of the diversity of the locations, as well as to split the sample more evenly for comparison.

Country	Localities (State/Province): urban/rural	Number of respondents
India	Mumbai (Maharashtra): Urban	304
	Kasargod (Kerala): Urban, Rural	300
	Sivaganga (Tamil Nadu): Urban, Rural	300
	Gorakhpur (Uttar Pradesh): Urban, Rural	300
	Cuttack (Orissa): Urban, Rural	300
	Dehradun (Uttaranchal): Urban, Rural	295
	Neemuch (Madhya Pradesh): Urban, Rural	300
Sri Lanka	Colombo (Western Province): Urban	206
	Jaffna (Northern Province): Urban, Rural	282
	Hambantota (Southern Province): Urban, Rural	301
	Badulla (Uva Province): Urban, Rural	311
Total		3199

2.1 Limitations

It must be emphasised that the findings from this study are *not* intended to be representative of India and Sri Lanka as wholes. As stated above, eleven different localities were selected to capture some of the diversity that exists within these two countries. A true representation would only be obtained through a pure random sampling according to the natural distribution of the population in the countries, rather than sampling which was undertaken to cover *a priori* heterogeneous locations.

The survey asked respondents about their calling patterns in terms of average number of calls made and received per month, etc., to what destinations, and for what purpose. It is recognised that the accuracy of this information is problematic because it is based on recollection, thus the data obtained is only an indication of individual calling patterns, and should be treated with caution. Real calling patterns can only be obtained from billing records; this was not done in this study for privacy reasons. In any case, the option to analyse billing records exists only for a small percentage portion of the sample: the 26% of fixed phone owners and the 2% of post-paid mobile owners.

Respondents were asked to indicate their monthly income for the purpose of analysis, including income from all sources, which means that the income reported is that for the household. Although respondents were asked to consider income from all sources, it is plausible that the income group indicated does not reflect true income levels. For instance, remittances, which can account for substantial portions of income in developing country households, may not have been included.

Considering the information this survey sought to reveal, a questionnaire containing more open-ended questions would have been optimal. However, given the size of the sample, as well as the depth of the questionnaire, this would not have

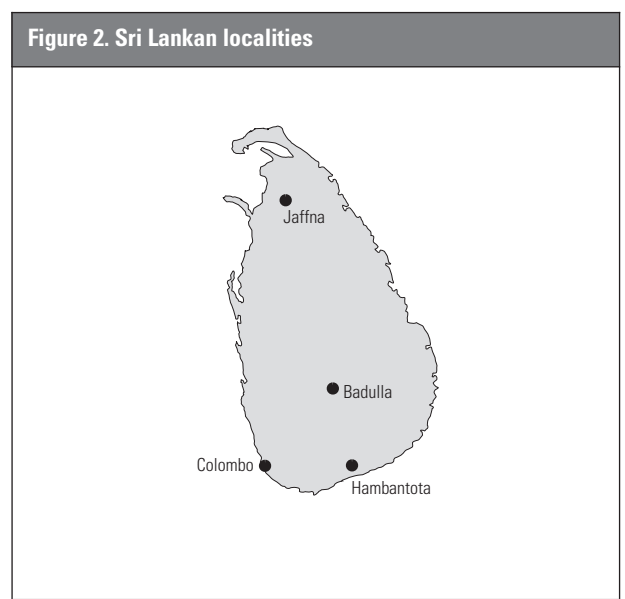
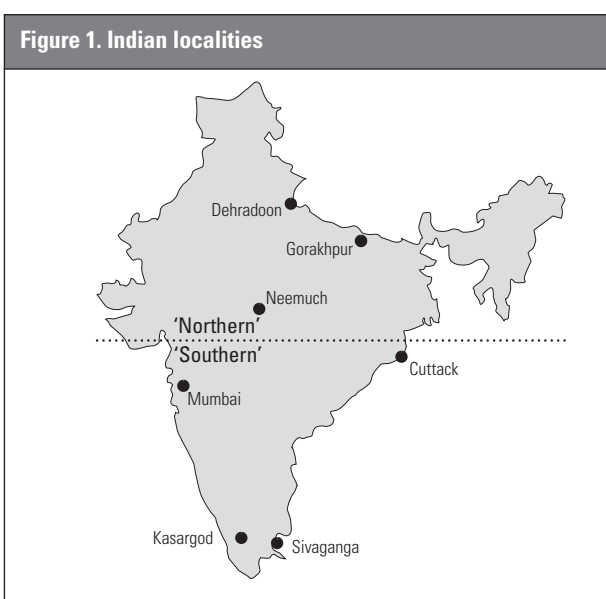
been a practical approach. For this reason, most of the questions were closed-ended, but respondents were given many non-exclusive options to choose from.

The analysis shows an over-representation of unemployed persons and housewives, which could not have been avoided unless a quota sampling was adopted by occupation categories.

One significant weakness of this study is that it does not study the financially *unconstrained*. Conclusions about the behaviour of the financially constrained will be validated only if the financially unconstrained are studied in comparison, that is, through a sample which also covers the SEC As and those with monthly household incomes over USD 100 per month. Furthermore, it is not possible to say whether behavioural patterns identified in this study are also relevant to the financially constrained in more developed markets, or are unique to the financially constrained of South Asia alone, without studying comparable data for those markets as well.

A further limitation is that the present study does not look at non-telecom users among the financially constrained, in particular, how far their non-use (or low levels of use) is associated with financial constraints.

Despite these limitations, this study is the first of its kind in a series of user studies that is being repeated over time and across locations through the LIRNEasia research network. In addition to providing a rich source of information contributing to the understanding of use of telecom services by the financially constrained in South Asia, this first phase also serves as a pilot study. This pilot has drawn attention to areas where modifications and improvements to the study design can be made, which may not have been apparent if a round of preliminary research were not carried out.



3. Findings

3.1 Forms of telecom access

While access to communication is a given in the developed world, half the world's population is beyond the reach of any form of telecommunication. According to *The Economist* (2004), during the last 25 years telephone penetration has been growing faster in low and middle income countries than in high income countries mostly due to saturation in developed country markets. In India, the number of main line phones per 100 people as at September 2005 was 4.07 (ITU 2004: A8-A9), while mobile penetration per 100 was 5.96 (TRAI 2005); as at September in Sri Lanka there were 5.14 main line phones per 100 people (ITU 2004: A8-A9) and mobile penetration was 15.85 per 100 (Samarasinghe 2005; CBSL 2005).⁹

The survey's results reflected these patterns, with greater mobile access in Sri Lanka than in India, but both countries having greater fixed phone access (not ownership) amongst the respondents than indicated by the above statistics, as shown in Figure 3.

As illustrated in Figure 3, respondents accessed more than one form of telephony – with public access being the most common mode of communication and fixed phones coming in second. In Sri Lanka, mobile phone usage lagged behind public access and fixed phones, yet mobile phones were used by a significantly larger percentage of respondents in Sri Lanka than those in either Northern or Southern India. As shown in Table 2, there appears to be a shift away from public access phones to fixed phones and mobile phones amongst respondents whose household income was between USD 50-100 per month (the higher income category). The trend towards greater fixed phone and mobile usage can be explained as the result of greater ownership of telephony by those in the higher income category. Mobile phones were also used by a larger number of respondents living in urban areas of the two countries than in the rural areas. There could be a number of rea-

sons for this discrepancy, such as lack of mobile service in rural areas, relatively high cost of handsets as well as that of usage, poor understanding of mobile phones or the lack of advertising by mobile operators in these areas.

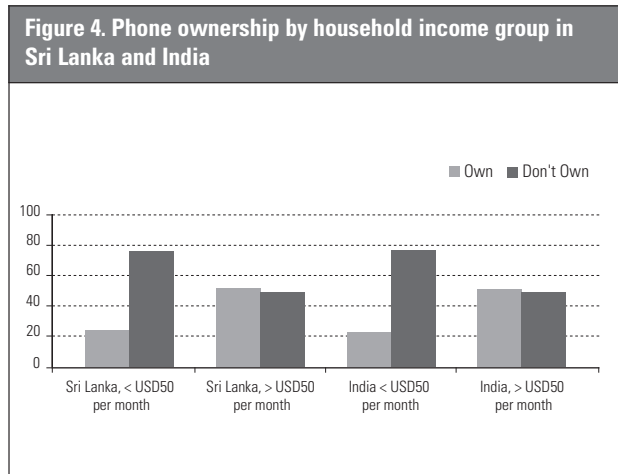
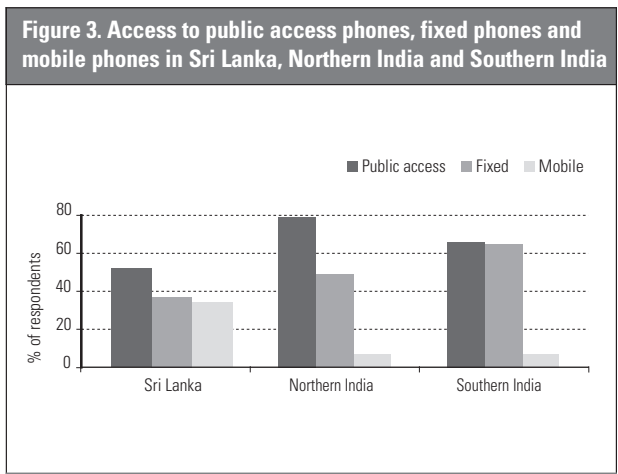
Telephone ownership differences between the two income groups are significant. For those whose household income was less than USD 50 a month, 76% and 77% of the survey's respondents in Sri Lanka and India respectively did not own phones. However, across the next income group, USD 50-100, the percentage of those who did not own phones fell to 49% in both countries. Ownership of phones in the higher income group was more than double that of the lower income segment. The preferred form of telephony, however, differed between the two countries. In Sri Lanka phone owners in both income categories marginally preferred mobile phones to fixed phones, whilst in India fixed phone ownership was significantly more prevalent.

3.2 Benefits of telecom access

Amongst the survey participants, social networking appeared to be the single most important benefit of having access to or owning a phone. Over 80% of the group utilised their telephones to make calls locally to friends and family. Phones were also used to transmit and receive messages through a third

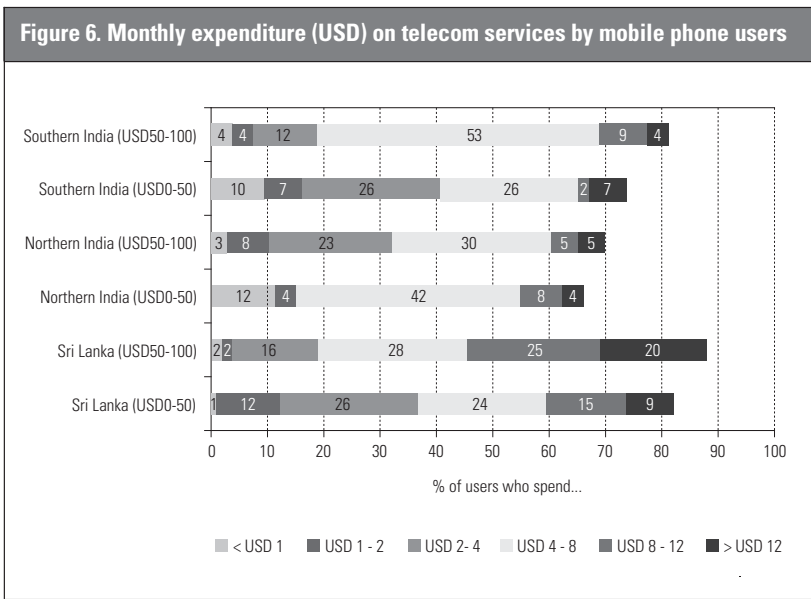
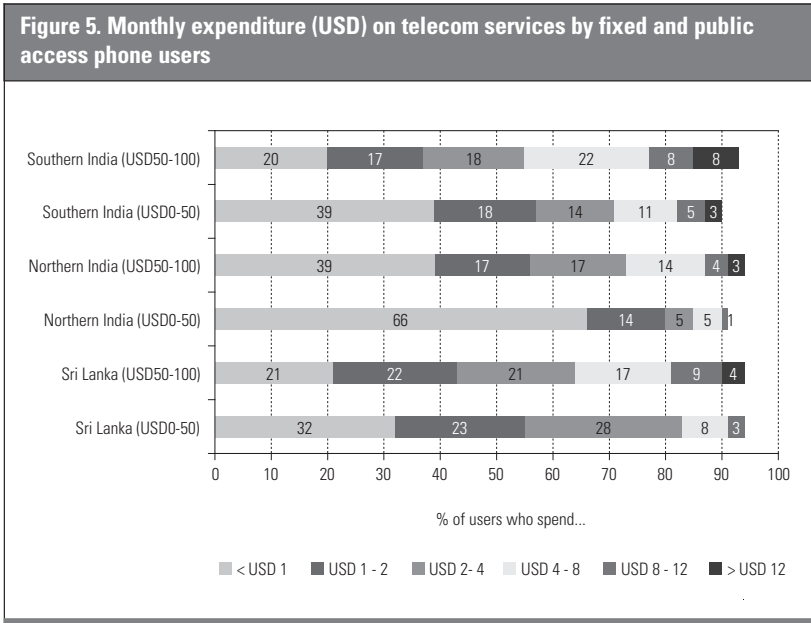
Table 2. Access patterns for different modes of telecommunications based on household income category

	Sri Lanka		Northern India		Southern India	
	< USD 50	> USD 50	< USD 50	> USD 50	< USD 50	> USD 50
Base	219	881	625	474	462	441
Public access	63	49	83	74	75	56
Fixed	26	40	48	56	61	69
Mobile	31	35	4	8	9	26



party – especially amongst users in urban areas. Only a very small percentage of the respondents indicated use of their phones for business purposes. This result also lends itself to the interpretation that, amongst this income group, business transactions may overlap with telephone communications with family and friends. Thus, a social call may also involve some degree of communications relating to work-related or business dealings. On the one hand, this could be construed as the result of the over-representation of housewives and unemployed persons in the survey group, because approximately a

quarter of the Southern Indian urban users of mobiles and fixed phones also undertook and arranged financial transactions over their phones. A user survey in Gujarat also demonstrated that business use is confined to a small minority (among the poorest segment), even with a larger and more balanced sample (Souter et al. 2005: 14). The results of this current study should be viewed with some degree of caution, recognising the limitations in the sample and the difficulties of recording and recalling telephone habits.



3.3 Expenditure on telecom

A majority of the survey respondents spent approximately USD 1-4 per month on communication. Expenditure figures were based on the respondents' ability to recall their monthly phone costs, rather than phone bills, and hence the figures stated should be treated with a degree of caution. Further, for fixed and mobile owners, monthly expenditure may include use by other people within the household, especially in the case of fixed phones (which tend to be used less as an individual phone and for which monthly expenditure reported is likely to be the average monthly bill). In the case of public access users, expenditure reported is more likely to be on an individual basis. Thus caution must be taken in comparing expenditure figures.

Over a fifth of fixed and public access users whose monthly household income was USD 50-100 spent at least USD 4 per month on phone calls; if the entire household expenditure were considered, this expenditure could constitute a minimum of 4% of the household's monthly income. Over 35% of the survey's mobile phone users spent at least USD 4 per month; again if the entire household expenditure were to be considered, for those in the lower income bracket of less than USD 50 this would constitute at least 8% of household income. On average around the world, it has been demonstrated that people spend approximately 2-3% of their income on telecoms. This figure has held true for whole countries, regions, cities, and on average to households (Intven 2000: 14; Milne 2006).

In the current study, for the lower income segment there was a greater percentage of people spending more than USD 4 per month in comparison to the higher income segment, which would imply the household as a whole spending more than 8% of household income on telecom services. New research around the developing world is uncovering similar findings. A recent demand study in Nigeria has indicated that on average Nigerians could be expected to spend 8% of their household income on telecom services (Intelecon 2005: 2). Similarly, a recent study of ten countries by Research ICT Africa! finds that communications costs in Africa amount on

average up to 10% of income (Gillwald 2005: 13). Souter et al. (2005) find that in Tanzania, amongst the lower income categories, expenditure on telecom services are in the range of 9.5-13.9% of household income; however the same study finds expenditure by the lower income categories in Gujarat (India) and Mozambique to be in the range of 2.8-5.6% of household income.

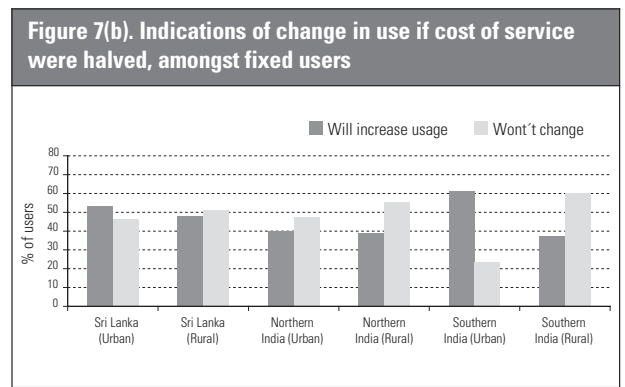
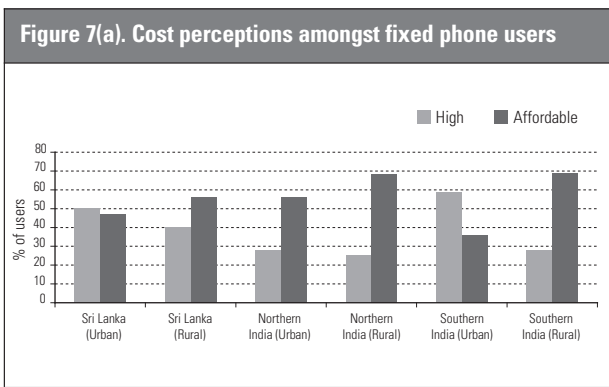
The study finds that the lowest income groups in all three contexts (that is, Tanzania, Gujarat and Mozambique) spend larger shares of their income on telecom services, even though the higher income groups spend larger nominal amounts. Nevertheless, the authors note that these figures may not be entirely accurate, because of the complexities of identifying 'real' income in the low income group (Milne 2006), and the difficulty in relating individual expenditure to household income. Theoretically, given an increase in income there would be some rise in the expenditure on telephony. Further research will be required to substantiate this initial finding.

3.4 Affordability and cost-related demand

Perceptions on telecommunication affordability and cost-usage patterns varied depending on the mode of access used by the respondents. Those who indicated that the cost of telecom services was 'affordable' are compared with those who indicated that the cost was 'high'. Similarly, those who indicated that they 'would not change usage' if costs came down by half are compared with those who indicated that they would change their use in some manner.

3.4.1 Fixed phone users

Across the surveyed rural localities, a greater proportion of respondents indicated they considered costs of fixed phones to be affordable than for urban respondents. In both urban Sri Lanka and Southern India, a larger percentage of users found costs to be high – Northern Indian urban respondents were an exception with fewer than 30% of this group stating that the cost was 'high'. In keeping with their perception of affordability, rural users in all three centres and users in urban Northern India stated that they would not consider changing their usage



patterns if the cost of telephony were halved. In Sri Lanka this could be explained by the frequency of calls made by respondents in urban and rural settings. Urban users indicated a greater frequency of calls per month – between six to 40 calls, whereas most rural users make an average of one to five phone calls each month. Therefore, affordability amongst rural Sri Lankan respondents could be attributed to both a lower usage of phones for essential purposes and also an implicit telecom/ transportation trade-off. For India, the Access Deficit Charge enables costs of rural Indian subscribers to be subsidised by phone operators. This charge is a compensation for the difference between actual cost of providing a service and mandated lower tariffs for providing subsidised access service to a class of subscribers (Malik and de Silva 2005).

3.4.2 Mobile users

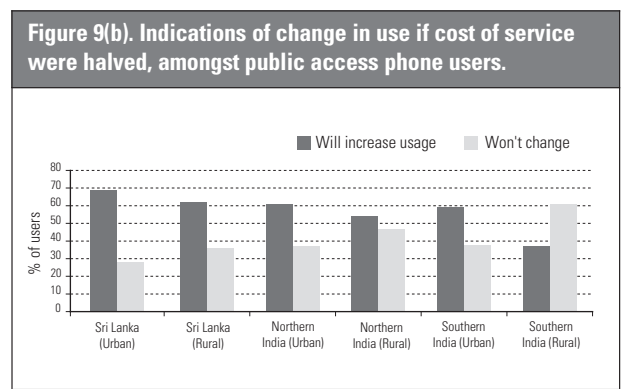
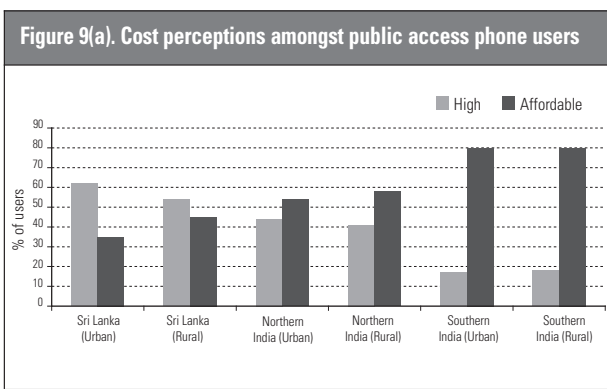
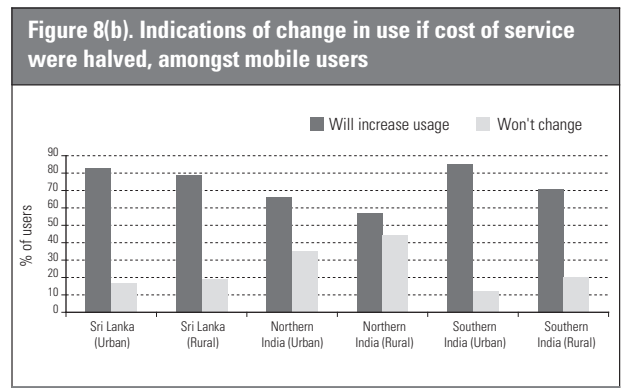
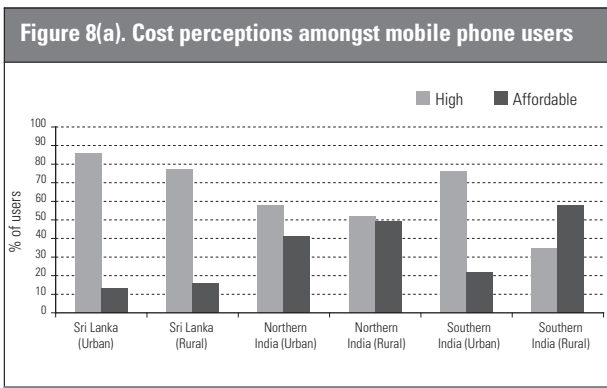
A majority of the survey participants who use mobile phones found the cost of communication to be high, with the exception of users in rural Southern India. Most of the surveyed mobile owners and users chose this particular mode of communication primarily for its convenience and constant availability. Those who had purchased a mobile did so because of its faster deployment time, the ability to carry it around and use it at anytime, and for its better network and connectivity (an aspect that was valued comparatively more by the rural com-

munities surveyed than those living in urban areas). The cost of communication appears to have been a secondary issue for mobile users. In India – both Northern and Southern – the mobile phone appears to be viewed as a luxury item as well, since respondents indicated that using a mobile phone improved their social status and that it was considered fashionable. *The Economist* (2005) draws attention to the fact that the tendency to view a phone as a status symbol in developing countries is driven by the fact that people in poorer nations have to spend a larger proportion of their income on their handsets than those in the rich world. Approximately 33% of mobile owners in India were using second-hand handsets in comparison to only 4% in Sri Lanka.

Despite cost of services being a secondary consideration, respondents in rural and urban localities in both countries indicate that they would increase usage if costs were halved. This suggests a greater elasticity of demand in terms of mobile phone usage, which suggests that mobile phones are still viewed as a luxury item as in the case of the respondents in India.

3.4.3 Public access users

Sri Lankan public access phone users found the cost of communication to be high, while a majority of the respondents in India stated that public access costs were affordable. In all



locations the majority of public access users stated that they would increase phone usage if costs were halved, with the exception of the Southern Indian rural respondents who found costs to be affordable and were not inclined to increase usage even if costs were reduced.

The Sri Lankan example suggests that costs may be artificially maintained at a higher level by intermediaries because communication bureaus (the Sri Lankan equivalent of the Indian public call office (PCO) – the most commonly used form of public access in both countries for *making* calls) have to pay normal tariffs (they get no reduced rates like in India where PCOs get discounted rates), so they charge the normal rate (that a regular fixed owner would pay) as well as their margin.¹⁰ The implication that usage would increase if costs were reduced indicated that public access users in Northern India and urban Southern Indian respondents were not using this mode of communication to its optimum. A possible reason for this could be mobility issues when accessing a public access phone or waiting times for calls – and a fall in costs could probably motivate these respondents to overcome these hurdles in order to increase the frequency of their calls.

4. Conclusion

As Ureta notes, “communications are not a completely different kind of expenditure, but forms part of the system of products and services on which families and individuals use their incomes in everyday life, and therefore needs to be factored in to the monthly budget. Access to communications in contemporary society is no longer a luxury, but constitutes a need among other needs” (2005: 23).¹¹ Yet, the notion of affordability, as this chapter has demonstrated, inevitably determines the way in which expenditure for communication is allocated.

That said, Milne (2006: 22) notes that a high percentage of income spent on telecoms can imply one of two situations: “the service is very highly valued (possibly increasing well-being by substituting for other spending), or equally that it is essential and highly priced (possibly, reducing well-being by displacing other desirable spending).”

Perceptions of affordability are quite divergent amongst rural and urban respondents in India and Sri Lanka, and also amongst users of different modes of telecom access. The ADC in India helps keep rural PCO tariffs low, perhaps contributing to differences in perceptions of affordability. However, in both countries, such public access phones were the main mode of communication for this income group; even though Indian users found cost of services through PCOs to be affordable, the willingness to increase usage if costs were reduced (indicated by the majority) reveals that costs are a significant factor in determining telephone usage.

Mobile users, with the exception of respondents living in rural communities in Southern India, indicated that costs of communication are high. Mobile telephony is considered to be one of the most feasible ways of bringing about universal tele-

phone access to developing countries. For example, in India, there were approximately 34 million wireless subscribers in 2004, with numbers expected to increase to 150 million in 2009 (Strother 2004: 7). Considering these statistics, it is significant that most mobile users within the survey population found present costs to be high.

A majority of the respondents in urban localities in both countries indicate a greater propensity to increase usage than those in rural areas – suggesting a more elastic demand curve for urban users. Rural users are most likely to use the telephone to make essential phone calls, while urban survey participants may use their phones as *more* than a basic commodity. The methodology used here falls short in the ability to substantiate such indications. A more rigorous approach to estimating elasticities of demand would certainly be very useful.

While this study provides indications of the percentage of income spent on telecom per month, the numbers are only indicative and should be treated with a degree of caution. There are problems associated with the comparison of telecom expenditures across the three modes of telecom, given the differing degrees of communal use vis-à-vis individual use. There are also problems associated with accurate identification of expenditure by the respondent, given the range of ways that he or she may make that expenditure (i.e., via a monthly bill, purchase of prepaid cards or payment for call to a vendor). Studies attempting to identify household expenditure on telecom services should be aware of these issues.

A useful modification to the methodology would involve a more reliable approach to recording usage patterns, including expenditure patterns. The use of simple recall methods have proven sub-optimal. Other means, such as the use of call logs on mobile phones, observation diaries or even interactive voice response technology (see Cohen and Lemish 2003) could perhaps improve the precision of data.

Further studies in this area could allow for national representation to explore telecom expenditure and perceptions of affordability on a broader scale; this would have the added advantage of coverage of all income categories to examine trends as incomes rise.

The findings from this pilot are being incorporated to a larger study conducted in five emerging Asian countries, which will address methodological issues of sampling to project on a nation-wide basis, recall inaccuracies by using a customised diary; and vagueness in answers by design of more focused questions, and has a reference group to compare with the financially constrained.¹²

Despite methodological limitations, the conclusions drawn from this pilot study provide evidence of trajectories followed in two South Asian countries with regard to affordability among the low income groups in both rural and urban centres. These findings provide valuable information for directing further research in this area and possible policy interventions and implications pertaining to an important sphere of contemporary society.

Notes

¹ See LIRNEasia Telecom Use on a Shoestring project at: <<http://www.lirneasia.net/projects/completed-projects/strategies-of-the-poor-telephone-usage/>>.

² Including public call offices (PCOs), public payphone booths, communication bureaus and post offices.

³ INR 5,000 in India and LKR 10,000 in Sri Lanka.

⁴ This is a standard classification, based on occupation and education level of the chief wage earner.

⁵ That is either made of cement, concrete and/or bricks (*pucca*) or of mud and/or wood (*kuchha*).

⁶ A maximum of five households were selected, beginning with one 'starting' household that was randomly selected from the electoral list.

⁷ The KISH grid is a random sampling technique to select one respondent from many eligible respondents in a household. In this case, names, gender and ages of all household members using phones (in the preceding three months) were recorded (in descending order of age). Based on the number of eligible respondents in the household and the household contact number (n^{th} interview of each starting point), a random number sheet was used to select one of the many eligible respondents. This ensures that respondents selected are not skewed to any gender or age, but are reflective of reality.

⁸ Only respondents over 18 years of age were interviewed.

⁹ The statistics quoted are the most recently available ones for a comparable time period at the time of the study (April-May 2005). By the time of publication of this paper, the numbers will have changed by far.

¹⁰ This could also have something to do with the large number of PCOs in India, and hence the greater use of PCOs in the country. As at December 2004, there were 2,531,000 PCOs in India (Singh 2005).

¹¹ Ureta argues that "Even in the poorest societies, as we see in the case of Nepal, families devote a certain part of their income to communications, because using them forms a compulsory part of what it means to live in contemporary societies" (2005: 23).

¹² See: <<http://www.lirneasia.net>> for further project details.

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Variations in Expenditure on Communications in Developing Countries: A synthesis of the evidence from Albania, Mexico, Nepal and South Africa (2000-2003)

Sebastian Ureta¹

1. Introduction

Analysis and debates around the so-called information society and its impacts on developing societies throughout the world often are afflicted with an excess of generalities and speculation about the concrete effects that information and communication technologies (ICTs) have on everyday lives. Frequently, discussion and analysis are based on very general statistics on the national number of computers or total figures for webpages, mobile phones or wireless hotspots in a specific area or for a particular group of users. Although useful information, a more grounded analysis of the concrete place that the use of these technologies has in the everyday life of the inhabitants of these societies is needed, in order to more deeply understand the place that ICTs occupy and how they can contribute to improving social inclusion, especially for the low income population.

To work towards a micro analytical approach to the reality of ICT use – which is part of the output of the project *Telecom Demand: Measures for Improving Affordability*² – expenditure on communications by households is examined in Albania, Mexico, Nepal and South Africa during 2000-2003. The relative amount of household income that families devote to communications is analysed for these countries first separately and then comparatively. Data for the analysis come from household expenditure surveys conducted by the central statistical agencies of the countries under study.

Household expenditure data in developing countries have been widely used to describe and analyse the variables accounting for general household consumption (for some examples see Akita et al. 1999; Bhalotra and Attfield 1998; Gong et al. 2000), to study the expenditure and demand for specific goods such as food (Girma and Kedir 2002) or water (Hajispy-

rou et al. 2002), or to compare consumption among different countries (Maitra and Ray 2000; Selvanathan and Selvanathan 2003).³ Unfortunately, none of these analyses has considered the expenditure on communications as a main objective, even though most of the surveys now include this area as a separate type of household expenditure.

For the purpose of these surveys, expenditure on communications is usually defined as the sum of all the expenditures related to the use of the means of communication including mail, telephone (landlines and mobile phones) and the Internet by the members of the household in a given period of time. The study of this expenditure provides a detailed quantitative perspective (covering all levels of usage) on the very specific space that communications occupy in the economy of the household, which complements the deeper and qualitative understanding derived from specific research on ICT use (which naturally tends to focus on higher income users). Monetary expenditure on communications represents an empirical approach to the examination of the place that ICT use occupies in the lives of the population of the developing societies considered in this chapter. In addition, the use of household expenditure surveys in the study of expenditure on communications allows not only a comparison among the different types of expenditures, but also among different countries. Because these kinds of surveys are mostly based on an international standard methodology,⁴ they can be used to compare the characteristics of different societies with relative ease as compared to the difficulties of comparison associated with other types of social science research methods.

With respect to the selection criteria for the countries examined in this chapter, the idea was to study a small group of developing societies from different areas of the world in order to compare the place that communications has in the

general expenditure of the households. The second selection criterion was the requirement for reasonably recent data (no older than 2000) with separately identified communications expenditure. Using these criteria, the countries selected for study were Albania, Mexico, Nepal and South Africa. On the basis of only four countries of course we cannot reach general conclusions. However, these countries are so disparate that any common features observed across them may warrant further investigation to see if they apply more widely.

In the following sections the place of expenditure on communications within general household expenditure for each country is analysed separately with a view to establishing some relationships between this expenditure and other characteristics of the household members such as their location and gender, age and education of the head of the household. In the second part of the chapter the four countries are compared with each other and with some industrialised societies in order to put the results into a wider context. The final section offers general conclusions on the place that communications expenditure occupies within the general expenditure of the households of the countries under study.

2. Countries under study

2.1 Albania (2002-2003)

Albania is the smallest country in the study with only three million inhabitants. Although 25% of the country's population lives in poverty (WB 2005a), in the context of the countries under study here, it has the lowest percentage of population living on less than two dollars per day (11.8%) and the lowest Gini index (28.2) as shown in Table 1. Albania's gross national income (GNI) per capita is quite low (USD 1740), and is well behind the GNI per capita of USD 22,810 in Western Europe.

Despite an enviable record of almost sustained economic growth in the Albanian economy since 1995 (about 5% per annum), there

have been some serious social and economic costs. These costs have included growing income inequalities, massive emigration from the poorest regions, and crumbling economic and social infrastructure. ... 25-30% of the population of Albania is still living under the national poverty line, and a disproportionate number of these are women. In addition, a further 30% are very close to the poverty line, and can be considered as potentially very vulnerable to an economic downturn (UNDP 2005: 14).

This situation of still limited development and growing inequality is reflected in ICT use in the country.

Albania has experienced a considerable decline in the United Nations' ICT diffusion rankings⁵ (UNCTAD 2005: 8) from position 104 in 1995 to 127 in 2002, and occupied the lowest position among Eastern European countries. This low position mainly results from limitations in access to telephones, computers and the Internet. Table 1 shows that the number of telephone landlines per 1000 people is still quite low (83). This situation is partly alleviated by a relatively high number of mobile phones (358 per 1000 people), but still only one out of four low income individuals (the 20% of lowest income) has access to a fixed or mobile phone whatsoever (UNDP 2005: 50). Regarding computers and the Internet the access is even lower. Only around 1% of the population has a computer or is an Internet user and access to services is still quite expensive (the cost of 20 hours of usage represents 24% of monthly GNI per capita).

In relation to the absolute expenditure on communications, Figure 1 illustrates that for Albania there is a positive relationship between the amount of money allocated to communications and the total monthly expenditure of the families, but also a very considerable scatter about the trend line. This points to the importance of exploring other variables besides total expenditure which affect spending on communications. The positive trend is also maintained in relation to the relative importance of the expenditure on communication among all other expenditures of the household. Table 2 shows the per-

General indicators 2003-2005			ICT indicators 2003-2005		
Population (millions)		3	Fixed telephones	Per 1000 people	83
% of population urban		44%		Cost of a call in \$ per 3 minutes	0.02
Gross national income per capita	2003	\$1740		Waiting list (thousands and as % of total lines)	12 (5%)
	Rank 2003	120	Mobile phones (per 1000 people 2003)	358	
	PPP	\$5,070	Personal computers (per 1000 people 2003)	11.7	
Population below \$2 a day		11.8%	Internet	(Users per 1000)	10
Human development rank		72	Internet monthly price	20 hours of use	\$29
Gini Index		28.2		% of monthly GNI per capita	24.8

centage allocated to communications varies positively with the general expenditure of the household. There is a clear trend for families with higher levels of expenditure⁶ to allocate a higher percentage of expenditure to communications, from 1.1% in the case of the first decile of expenditure to 4.8% in the case of the tenth. Along with expenditure on rent and home improvements, expenditure on communications is one of the few variables that shows a fairly constant negative relationship with expenditure on food and drink, which is by far the most important expenditure by groups at lower consumption levels.

In order to analyse the characteristics of Albanian families that could affect the percentage of the expenditure dedicated to communications, Table 3 shows the results of a regression analysis based on four regression models. In the first (I) only the variable location (urban versus rural) is included. In models II and III, two demographic variables are included (sex and age of the head of the household) while model IV also includes the level of education of the head of the household.⁷ The first model shows a significant difference of 1.38% in the percentage allocated to communications between the families that live in urban areas versus the ones that lives in rural areas. The inclusion of both gender and age of the head of the household does not affect this value very much and only the families in which the head of the household is an adult aged 40 to 59 show a significant difference (0.66%) compared to those in which the head is a young adult (20 to 39 years old). The inclusion of the

Figure 1. Scatter plot and linear regression of communication expenditure per total monthly expenditure in Albania*

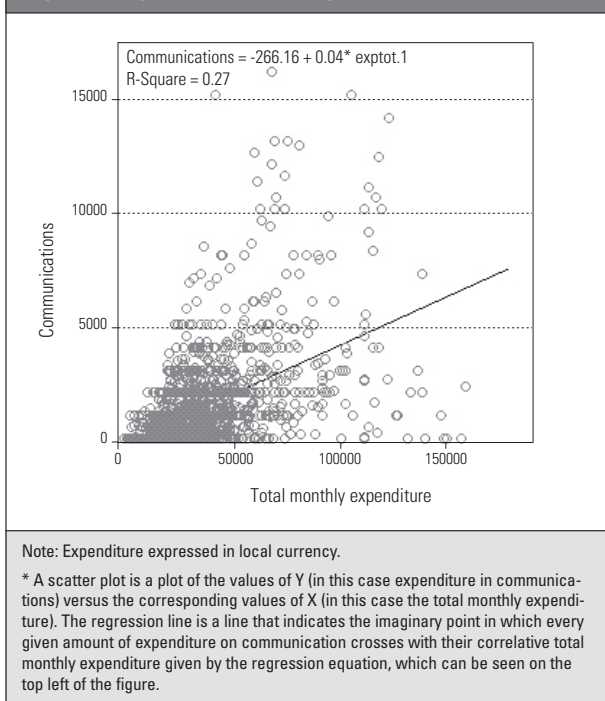


Table 2. Percentage of expenditure by groups of items and deciles of expenditure in Albania 2002-2003

	Deciles of monthly expenditure										Total
	I	II	III	IV	V	VI	VII	VIII	IX	X	
Food and drinks	65.3%	65.0%	63.6%	61.3%	58.2%	55.8%	54.1%	51.1%	45.9%	40.8%	50.9%
Rent and home improvements	6.9%	8.9%	11.6%	12.6%	14.2%	16.2%	17.6%	21.1%	23.3%	35.8%	22.6%
Water, gas, heating fuel	9.8%	7.2%	9.0%	8.1%	7.4%	6.3%	6.9%	5.3%	4.5%	2.9%	5.5%
Public transport	1.3%	1.1%	0.9%	1.1%	1.3%	1.1%	0.8%	1.0%	0.7%	0.3%	0.8%
Home maintenance, products and services	6.2%	5.6%	4.6%	4.1%	4.3%	4.0%	3.5%	3.4%	3.6%	2.0%	3.4%
Personal care	2.4%	2.6%	2.3%	2.4%	2.6%	2.8%	2.5%	2.8%	2.9%	2.0%	2.5%
Newspapers, books, CDs	0.2%	0.1%	0.2%	0.2%	0.3%	0.3%	0.4%	0.3%	0.4%	0.3%	0.3%
Communications	1.1%	1.6%	1.7%	2.9%	3.4%	3.8%	3.9%	3.6%	4.0%	4.8%	3.8%
Clothing and shoes	4.3%	5.0%	3.7%	3.7%	4.3%	4.6%	4.4%	4.8%	5.6%	3.6%	4.3%
Domestic goods	0.4%	0.4%	0.5%	0.5%	0.6%	0.6%	0.5%	0.6%	0.7%	0.4%	0.5%
Travel/tourism	0.1%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.5%	0.2%	0.4%	0.2%
Fuel and vehicle maintenance	0.0%	0.2%	0.2%	0.4%	0.3%	0.7%	2.0%	1.6%	3.6%	3.6%	2.1%
Other expenditures	1.9%	2.1%	1.7%	2.6%	2.8%	3.3%	3.0%	3.7%	4.1%	2.8%	3.0%
Communications *	109.3	257.9	341.1	682	917	1184.9	1376.3	1530	2195	5247	1384
Total *	10,201	15,993	19,650	23,254	27,002	31,044	35,425	42,354	54,414	109,040	36837

Source: Own calculations based on data from the 2002-2003 Albania Panel Survey (INSTAT 2003).

* In local currency.

		I	II	III	IV
Constant		2.33** [0.13]	2.15** [0.27]	1.82** [0.33]	2.04** [0.35]
Location	Urban = 1	1.38** [0.18]	1.39** [0.18]	1.36** [0.18]	0.94** [0.21]
Sex of head of household	Male = 1		0.2 [0.27]	0.15 [0.27]	-0.33 [0.3]
Age of head of household	40 to 59 years = 1			0.66* [0.23]	0.53 [0.23]
	Over 60 years = 1			0.25 [0.26]	0.54 [0.27]
Education of head of household	High School = 1				0.75** [0.22]
	University = 1				2.11** [0.32]
R²		0.03	0.031	0.035	0.064
Observations		1779	1778	1778	1630
Note: ** Indicates a correlation at .001 significance level. Note: The standard error is in parenthesis.					

level of education of the head of the household in model IV changes this situation. The location of the family loses some of its importance, declining from 1.36% to 0.94%, but is still significant, while both 'complete high school' and 'university degree' are significant, especially the second which differs by 2.11% between families, more than two times the difference for location. This is to say that families in which the head of the household has a university degree tend to spend more than double the percentage on communications in comparison with households in which the head of the household has only completed basic education.

The R² of each of the models is low, but it is interesting to see that when the education of the head of the household is included, the percentage of the variance that the model explains doubles from 3.5% to 6.4%. We can conclude from this analysis that the location of the household is a central explanatory variable in relation to expenditure on communications by the household, but when the education of the head of the household is included, possession of a university degree appears to be the variable that affects the level of expenditure on communications the most.

2.2 Mexico (2000)

Mexico is the biggest country in this study. While being a very large economy, occupying the tenth position in terms of its total GNI based on data from the World Bank (WB 2005b), Mexico's predominant problem in terms of development is the high level of income distribution inequality. This can be observed in its Gini index of 54.6 which is quite typical for Latin American (Londoño and Szekely 1997). Although GNI per capita is USD 6,230, 26.3% of the population lives on less than two dollars per day, more than double the percentage for Albania, an economy with a much smaller GNI per capita.

This inequality is reflected in the patterns of adoption of ICTs in the form of the development of what has been called a

General indicators 2003-2005		ICT indicators 2003-2005		
Population (millions)	105	Fixed telephones	Per 1000 people	158
% of population urban	75%		Cost of a call in \$ per 3 minutes	0.16
Gross national income per capita	2003		\$6230	Waiting list (thousands and as % of total lines)
	Rank 2003	68	Mobile phones (per 1000 people 2003)	291
	PPP	\$9590	Personal computers (per 1000 people 2003)	82
Population below \$2 a day	26.3%	Internet	(Users per 1000)	118
Human development rank	53	Internet monthly price	20 hours of use	US 23
Gini Index	54.6		% of monthly GNI per capita	4.6

Sources: World Development Indicators (WB 2005b), Human Development Report (UNDP 2005) and ICT at a Glance Mexico (WB 2003).

'patchwork adoption' (Garcia-Murillo 2003) of technologies.⁸ In this specific context "the great disparities that exist in these Latin American economies result in some business and consumer segments adopting sophisticated technologies early while others are likely to take much longer to adopt it if at all" (Garcia-Murillo 2003: 2). Among the factors contributing to this situation are the lack of telephone infrastructure in vast areas of the countries, along with high variations in terms of income, access to relevant education, and ICT development and experience. These disparities, in the particular case of Mexico, mean that although the country has been one of the major gainers in the United Nations' ICT diffusion rankings (UNCTAD 2005: 7) from position 116 in 1995 to 73 in 2002, it is still by far the lowest performer in the OECD area (UNCTAD 2005: 9).

In the context of this study, Mexico presents some of the highest indicators, especially in terms of telephone access and Internet penetration. In relation to telephone access, although

Figure 2. Scatter plot and linear regression of communication expenditure per total monthly expenditure in Mexico

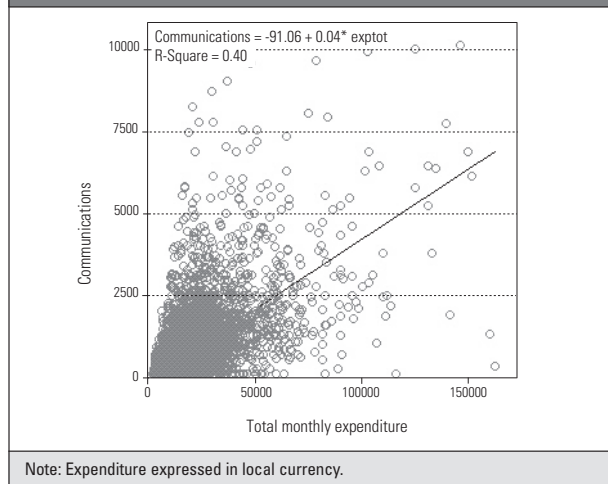


Table 5. Percentage of expenditure by groups of items by deciles of expenditure in Mexico 2000

	Deciles of monthly expenditure										Total
	I	II	III	IV	V	VI	VII	VIII	IX	X	
Food and drinks	49.4%	49.6%	47.3%	44.7%	43.1%	41.0%	37.8%	34.7%	29.6%	19.3%	31.5%
House rent and improvements	10.5%	9.7%	9.7%	10.2%	9.3%	8.7%	9.4%	8.8%	9.0%	8.7%	9.0%
Public transport	3.9%	5.0%	5.8%	6.0%	6.3%	6.3%	6.8%	5.7%	4.5%	2.1%	4.4%
Home maintenance products and services	9.3%	7.3%	6.5%	5.9%	5.6%	5.3%	5.0%	4.8%	4.8%	5.4%	5.4%
Personal care products	5.9%	5.7%	5.7%	5.7%	5.4%	5.6%	5.2%	5.0%	4.8%	3.5%	4.6%
Education	2.0%	3.5%	3.7%	4.6%	4.9%	5.3%	6.3%	6.7%	7.3%	11.7%	7.9%
Newspapers, books and CDs	0.2%	0.2%	0.3%	0.3%	0.4%	0.6%	0.7%	0.8%	1.0%	1.2%	0.8%
Entertainment	0.1%	0.3%	0.5%	0.6%	0.9%	0.9%	1.3%	1.7%	1.8%	2.7%	1.7%
Communications	1.2%	1.5%	1.9%	2.2%	2.5%	3.0%	3.1%	3.6%	4.2%	3.8%	3.4%
Clothing and shoes	5.5%	6.0%	6.1%	6.3%	6.8%	6.8%	7.0%	7.2%	7.3%	6.7%	6.8%
Domestic goods	0.7%	0.7%	0.8%	0.8%	0.9%	1.0%	0.8%	1.0%	1.0%	0.9%	0.9%
Health	6.9%	4.9%	4.4%	4.4%	4.4%	3.8%	3.1%	2.9%	3.6%	3.2%	3.6%
Domestic technologies	0.3%	0.6%	0.6%	0.8%	0.9%	1.0%	1.4%	1.3%	1.4%	1.2%	1.2%
Furniture	0.3%	0.7%	0.9%	1.0%	1.3%	1.2%	1.9%	2.7%	2.5%	4.5%	2.8%
ICTs	0.2%	0.3%	0.7%	0.8%	0.7%	0.9%	1.0%	1.2%	1.3%	1.4%	1.1%
Travel/Tourism	1.0%	0.8%	0.8%	0.7%	0.7%	0.8%	0.8%	1.0%	1.0%	1.3%	1.0%
Car, bike, etc.	0.0%	0.3%	0.7%	0.9%	1.0%	1.6%	0.6%	2.1%	3.6%	6.2%	3.3%
Fuel and vehicle maintenance	0.5%	1.3%	1.8%	2.0%	2.6%	3.4%	4.0%	4.8%	5.9%	6.2%	4.7%
Other expenditures	2.1%	1.8%	2.0%	2.3%	2.4%	3.0%	3.6%	4.1%	5.7%	9.7%	5.8%
Communications *	23.4	60.3	105.3	155.6	223.8	319.3	400.1	585.9	955	1818.6	464.7
Total *	1991	4125	5692	7195	8819	10712	12900	16445	22736	47896	13851

* In local currency.

Source: Own calculations based on the data from the Encuesta nacional de gastos de los hogares (INEGI 2000).

Table 6. Non-standardised coefficients of regression percentage of expenditure on communications in Mexico 2000					
		I	II	III	IV
Constant		1.61**	2.32**	1.44**	1.4**
		[0.07]	[0.12]	[0.14]	[0.16]
Location	Urban = 1	1.84**	1.78**	1.89**	1.41**
		[0.09]	[0.09]	[0.09]	[0.11]
Sex of head of household	Male = 1		-0.82**	-0.56**	-0.96**
			[0.11]	[0.11]	[0.11]
Age of head of household	40 to 59 years = 1			0.81**	1.16**
				[0.1]	[0.11]
	Over 60 years = 1			1.3**	2.47**
				[0.12]	[0.15]
Education of head of household	High School = 1				0.91**
					[0.12]
	University = 1				1.84**
					[0.15]
R²		0.036	0.041	0.053	0.081
Observations		10078	10078	10019	8370
Note: ** Indicates a correlation at .001 significance level.					
Note: The standard error is in parenthesis.					

the cost of the calls is much higher than in Albania or Nepal, the rates of penetration of telephone landlines are higher, at 158 telephone lines per 1000 inhabitants. The rate of penetration of mobile telephony is lower than in Albania⁹ but still high, at 291 handsets per 1000 inhabitants, while again the possession of personal computers and the use of the Internet are among the highest in the group (at 82 and 118 per 1000 inhabitants respectively). This last can be linked both to the relatively high number of fixed telephone lines and the fact that the cost of the Internet is a relatively low proportion of income, with 20 hours of service costing less than 5% of the GNI per capita.

This higher level of access to communication is reflected in the fact that the population of Mexico has the highest expenditures on communications of the four countries in this study. In relation to the absolute expenditure, Figure 2 shows that there is commonly a positive relationship between more expenditure in communications and more general expenditure in the household, although again there is a very considerable scatter about the trend line.

Table 5 shows the relationship between expenditure on communications and other products and services by deciles of expenditure, which appears quite similar to that for Albania. From the lowest consumption groups to the highest we can see how the percentage of expenditure on communications rises

from 1.2% to reach a peak in the IX decile of 4.2%, descending to 3.8% in the highest expenditure group. When considering other activities, the variations appear to be less clear than in the case of Albania. While the relevance of food and drink diminishes in relation to total expenditure (as in the Albanian case), the expenditure that is left is allocated to very diverse groups of activities, including communications. In this case the patterns of consumption are much more diverse than those found in Albania and South Africa, as shown below.

Using the same four-model regression for percentage of income allocated to communications as in the case of Albania, model I (which includes only the location of the household) shows a similar pattern as for Albania, with urban location more than doubling the percentage allocated to communications as part of the general expenditure when compared to rural location (1.61% versus 3.45%). However, this similarity disappears when both the gender and age of the head of the household are included in the model. As shown in columns II and III in Table 6, in Mexico both age and gender of the head of the household are significant predictors of the percentage devoted to communications, while for location, the significance remains more or less the same.

Model II shows that the head of the household being male results in a negative impact of -0.82% on the expenditure on communications, which is less important than the result for location (1.78%) although still significant. One explanation for this negative effect could be that female-headed households have a male partner working away from home with whom they communicate frequently (something that is quite probable if we take into consideration the high rates of migration of Mexican workers to the US) but further research would be needed to clarify this point. When the age of the head of the household is introduced in model III, the significance of sex diminishes and age becomes the second most important factor after location, especially in the case of families in which the head of the household is more than 60 years old (making a difference of 1.3% in the percentage devoted to communications). One hypothesis is that age is relevant because of the possibility that the older the head of the household is, the larger the household, indicating that general expenditure (including communications) is higher.

Finally model IV shows that when education is introduced sex and age become more important while location loses some of its relevance, especially in the case of households in which the head is more than 60 years old (which results in a difference of 2.47%). At the same time, the possession of a university degree appears to make a significant difference of 1.84% in expenditure. In sum, for the Mexican case all the variables seem to be relevant predictors of expenditure on communications, especially location and when the head of the household is over 60 years old or has a university degree.

2.3 Nepal (2002-2003)

With a GNI per capita of a mere USD 240 and 80% of its population living on less than two dollars per day, Nepal is by far the poorest of the countries in our study. One of the main causes of poverty in the country, among others (such as low economic growth and low agricultural productivity), is related with “low levels of social and economic infrastructure, even in the contexts of south Asian countries” (UNDP 2001: 33). Inadequate infrastructure, especially in relation to access to education, health and other public services, has limited the degree to which the population of the country can develop higher degrees of empowerment, a central element for Nepal’s development (UNDP 2004), especially in the case of rural women and other minorities.

This lack of infrastructure is also clearly apparent in terms of ICTs. Alongside Bangladesh, the country is the lowest performer in the South Asia area in terms of the United Nations’ ICT diffusion index, occupying position 142 (UNCTAD 2005: 6) among the 165 countries included in the study. This low position is mainly due to lack of ICT connectivity and infrastructure with only 16 fixed telephone lines, two mobile phones and 3.7 personal computers per 1000 inhabitants. Also, waiting lists for a fixed telephone line are by far the highest of the four countries under study (286,000, representing 72% the total number of lines already in existence in the country), a fact that reveals a huge demand for communications facilities has not been satisfied. In addition, only three people out of 1000 use the Internet regularly and the cost of 20 hours of this service, although fairly low by international standards, represents more than 70% of the monthly GNI per capita.

Although the ICT sector “has grown as fast, if not faster, than any other country in the South Asia region – despite the absence of foreign investment” (ITU 2000b), ICTs are still quite limited as has been clearly recognised:

An important milestone was reached in 1999 when teledensity reached one line per 100 inhabitants. However, there are still more than 260,000 on the waiting list, implying an average waiting time of more than six years (those on the waiting list have paid a deposit of 50 Rs, just under 1US\$). The price of line connection is 2,000 Rs (around US\$29). Around two-thirds of the telephones are in the Katmandu valley, which accounts for less than 3 per cent of the population. Katmandu itself has a teledensity of 18.2 lines per 100 inhabitants compared with 1.07 in the country as a whole and 0.06 in rural areas (data for mid-November 1999). ... Of these [75] districts, 5 do not have a local exchange and use HF radio. Although some of the districts have an exchange, no lines are connected. In total, twelve districts are without any direct service. The total population of these districts without direct service is 1.2 million (ITU 2000a).

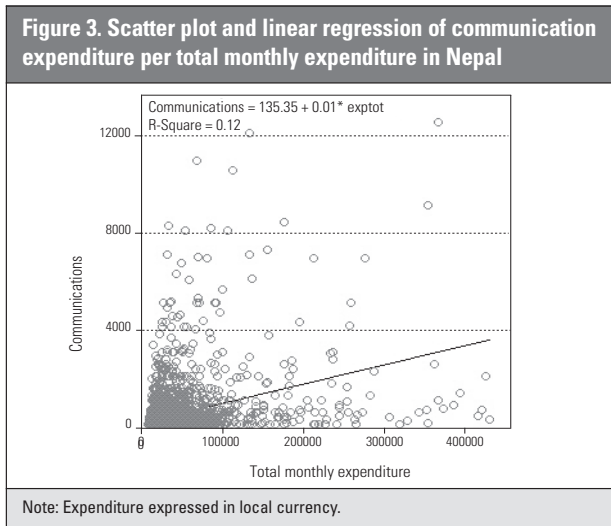
It is worth noting that at the time of the household survey the regular monthly fixed line rental was 200 Nepalese rupees. Mobile service was only available in selected urban areas, and for the most part only on a post-paid basis (prepaid service was first introduced during the survey period, and supplies rapidly sold out). It is not surprising that communications expenditure is quite low. According to the analysed data, over 50% of the households did not spend money on communications at all during the period covered by the survey.¹⁰ As shown in Figure 3, absolute communication expenditure in relation to general monthly expenditure shows a visibly lower correlation in the case of Albania or Mexico confirmed by the low r-square of the regression (0.09) This may be linked with the fact that many rural Nepalese households, even if relatively comfortably off, have very limited physical access to phone service.

This low expenditure is reflected also in Table 8, which shows that this expenditure has the lowest relative significance level of the four countries. In this case, even for the higher expenditure groups, the amount of resources devoted to communications is not more than 2.3% of total expenditure.¹¹ This

Table 7. General and ICTs indicators for Nepal

General indicators 2003-2005			ICT indicators 2003-2005		
Population (millions)		25	Fixed telephones	Per 1000 people	16
% of population urban		13%		Cost of a call in \$ per 3 minutes	0.01
Gross national income per capita	2003	\$240		Waiting list (thousands and as % of total lines)	286 (72%)
	Rank 2003	192	Mobile phones (per 1000 people 2003)	2	
	PPP	\$1470	Personal computers (per 1000 people 2003)	3.7	
Population below \$2 a day		80.9%	Internet	(Users per 1000)	3
Human development rank		136	Internet monthly price	20 hours of use	US\$ 13
Gini Index		36.7		% of monthly GNI per capita	70.3

Sources: World Development Indicators (WB 2005b), Human Development Report (UNDP 2005) and ICT at a Glance Nepal (WB 2003).



situation is partially explained by the fact that the lower importance of expenditure on food and drink (from representing 72.6% of income to 15.4%) is not translated substantially into more expenditure on communications, as happens in the other countries, but rather into other areas of expenditure, such as ‘other expenditures’ and ‘rent and home improvements’.

The regression analysis shows that in the case of model I for Nepal, as happened in Albania and Mexico, the location of the household does make a significant difference in the percentage devoted to communications by members of the households. As shown in Table 9, the location of the household in an urban environment means almost a doubling in expenditure in communications, from representing 1.4% of total expenditure in rural areas to 2.3% in urban ones. For people living in cities (only 13% of the total population of the country, as shown in Table 7), communications expenditure tends to

Table 8. Percentage of expenditure by groups of items by deciles of expenditure in Nepal 2002-2003

	Deciles of monthly expenditure										Total
	I	II	III	IV	V	VI	VII	VIII	IX	X	
Food and drinks	72.6%	69.9%	68.2%	65.6%	62.1%	55.9%	50.6%	42.7%	31.3%	15.4%	31.6%
Rent and home improvement	1.3%	2.2%	1.6%	3.0%	2.5%	4.4%	8.1%	6.7%	13.8%	24.7%	16.2%
Water, gas, heating fuel	2.2%	1.2%	1.2%	1.1%	1.2%	1.3%	1.2%	1.1%	0.9%	0.4%	0.8%
Public transport	0.5%	0.4%	0.5%	0.7%	0.7%	0.7%	0.8%	0.8%	0.7%	0.5%	0.6%
Home maintenance	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%
Personal care	0.6%	0.4%	0.5%	0.5%	0.5%	0.4%	0.4%	0.4%	0.3%	0.2%	0.3%
Education	0.5%	0.6%	0.9%	1.0%	1.2%	1.3%	1.2%	1.9%	1.9%	2.2%	1.8%
Newspapers, books, CDs	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%
Entertainment	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Communications	0.7%	0.9%	1.3%	1.2%	1.5%	1.7%	1.9%	2.2%	2.3%	1.4%	1.6%
Clothing and shoes	2.1%	3.1%	1.9%	2.3%	2.5%	2.3%	2.6%	2.0%	1.5%	1.0%	1.5%
Domestic goods	4.4%	4.8%	4.6%	4.4%	4.0%	4.0%	4.0%	3.7%	3.6%	2.2%	3.1%
Health	1.6%	1.7%	1.9%	1.8%	2.5%	2.8%	2.1%	2.3%	2.2%	1.8%	2.0%
Domestic technologies	0.0%	0.1%	0.1%	0.1%	0.1%	0.4%	0.5%	0.6%	0.5%	0.4%	0.4%
Furniture	0.0%	0.0%	0.1%	0.2%	0.5%	0.5%	1.2%	1.0%	1.5%	1.1%	1.0%
ICTs	0.2%	0.4%	0.8%	0.6%	1.1%	1.3%	1.5%	2.4%	3.3%	2.7%	2.4%
Games & toys	0.1%	0.1%	0.1%	0.2%	0.1%	0.2%	0.4%	0.4%	0.4%	0.2%	0.3%
Travel/tourism	0.1%	0.0%	0.2%	0.4%	0.5%	0.6%	0.9%	1.1%	1.3%	1.3%	1.1%
Fuel and vehicle maintenance	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.2%	0.4%	1.0%	1.5%	1.0%
Other expenditures	13.1%	13.9%	16.1%	16.8%	18.6%	21.8%	22.3%	29.9%	33%	42.6%	34.1%
Communications *	20	38	77	88	139	193	274	469	786	1347	341
Total *	2470	4371	5845	7441	9239	11621	15035	21145	34184	111581	22281

* In local currency.

Source: Own calculations based on the data of the Nepal Living Standards Survey 2002-2003 (CBS 2004).

occupy a much bigger place than for the ones in rural areas, for whom this kind of expenditure is almost non-existent.¹² This relevance of location does not change substantially in models II and III, while gender and age of the head of the household appear as not important. Finally it is relevant to note, in model IV, that in Nepal an urban location is still a very influential factor for expenditure on communications when the education of

the head of the household is introduced in the regression model.

In contrast to the other countries analysed here, for Nepal an urban location is always central to the percentage of spending devoted to communications.

The distribution of telecommunication services, however, shows a clear urban bias. While 20.2% of urban households have television sets, the rural areas account for only 1%. The national ratio of 14 telephones per 1,000 people still concentrates largely on towns and cities; 55% of the Village Development Committees (VDCs) still have no telephone facilities ... Moreover, the allocation of funds during the last years indicates low priority to rural telecommunication services (UNDP 2004: 40).

In this context it is not surprising that location is always an influential factor, despite the other variables that we introduce in the regression model, even ones that could be much more directly related to income such as the level of education of the head of the household.

2.4 South Africa (2000)

Available data for South Africa locates it more or less in the middle of the countries considered in this study. With a GNI per capita of USD 2,750 it stands well above Albania and Nepal, even though 34% of its population lives on less than two dollars per day. This can be explained by the high levels of inequality in the distribution of income, the highest of the four countries, with a Gini index of 59.3, which means it ranks among some of the most unequal income distributions in the world (UNDP 2005).

This high level of inequality for income distribution is reflected in the access to fixed telephony.

Despite significant gains over the last five years, the distribution of telephony service in South Africa continues to reflect the highly uneven development of the infrastructure of the past – with 18 per cent of black households and 82 per cent of white households

Table 9. Non-standardised coefficients of regression percentage of expenditure on communications in Nepal 2002-2003

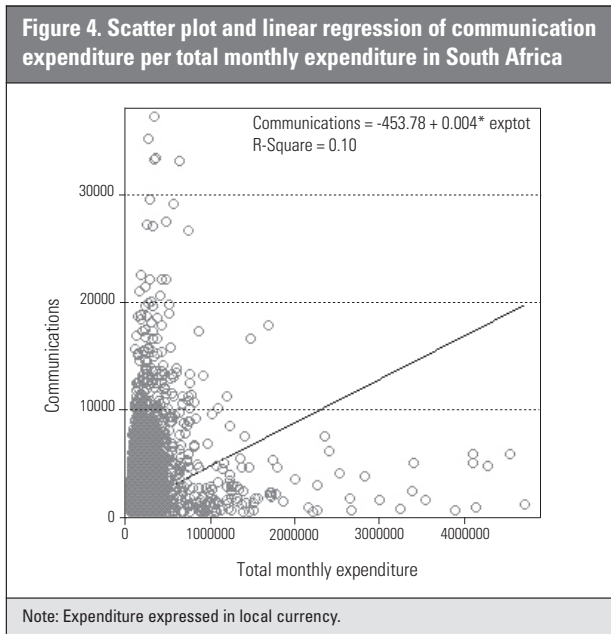
		I	II	III	IV
Constant		1.4 ** [0.05]	1.72** [0.12]	1.67** [0.17]	1.64** [0.17]
Location	Urban = 1	0.93** [0.2]	0.94** [0.2]	0.94** [0.2]	0.65** [0.21]
Sex of head of household	Male = 1		-0.396* [0.13]	-0.4* [0.14]	-0.37 [0.14]
Age of head of household	40 to 59 years = 1			0.03 [0.15]	-0.04 [0.15]
	Over 60 years = 1			0.11 [0.01]	0.07 [0.15]
Education of head of household	High School = 1				1** [0.2]
	University = 1	0.005 3771	0.007 3771	0.008 3734	0.013 3593
R²		0.036	0.041	0.053	0.081
Observations		10078	10078	10019	8370

Note: ** Indicates a correlation at .001 significance level.
Note: The standard error is in parenthesis.

Table 10. General and ICTs indicators for South Africa

General indicators 2003-2005		ICT indicators 2003-2005	
Population (millions)	46	Fixed telephones	Per 1000 people 107
% of population urban	59%		Cost of a call in \$ per 3 minutes 0.15
Gross national income per capita	2003 \$2750		Waiting list (thousands and as % of total lines) 50 (1%)
	Rank 2003 94	Mobile phones (per 1000 people 2003)	364
	PPP \$10.960	Personal computers (per 1000 people 2003)	72.6
Population below \$2 a day	34.1%	Internet (Users per 1000)	68
Human development rank	120	Internet monthly price	20 hours of use US \$33
Gini Index	57.8		% of monthly GNI per capita 15.4

Sources: World Development Indicators (WB 2005b), Human Development Report (UNDP 2005) and ICT at a Glance South Africa (WB 2003).



with over 80 per cent of all households having access. South Africa has over 100,000 public pay phones distributed nationally. While the positive effect of policies to bridge this gap are beginning to be evident, the differentiation in access and services between rural and urban households remains high – with 64 per cent of urban households and only 9 per cent of rural households [having access to landline services] (ITU 2001).

In recent years, lack of fixed telephone availability has been partially alleviated by the massive access to mobile phones with the result that “46.9% of households in South Africa have access to telecommunications, both fixed and mobile” (Gillwald 2005: 8); although this figure “is lower than the average for other lower middle income countries with average household penetration of 49.4%” (ibid.). Even more important:

Of the 32% of the population with mobile phones, 14% also have access to a fixed phone, suggesting that while mobile telephony offers convenience and additional utility it has only extended access to a further 18% of the population. While this is significant more than 68% continue not to own phones. In this regard South Africa compares poorly with other lower middle income countries (Gillwald 2005: 29).

Table 11. Percentage of expenditure by groups of items by deciles of expenditure in South Africa 2000

	Deciles of monthly expenditure										Total
	I	II	III	IV	V	VI	VII	VIII	IX	X	
Food and drinks	57.5%	58.8%	54.7%	49.5%	46.8%	42.6%	37.5%	33.1%	25.3%	7.2%	18.2%
Rent and home improvements	3.1%	3.1%	4.0%	4.7%	5.0%	5.5%	5.8%	7.2%	10.7%	31.6%	22.7%
Water, gas, heating fuel	9.7%	9.5%	9.4%	8.9%	8.5%	8.1%	7.2%	6.7%	5.9%	2.2%	4.1%
Public transport	2.8%	2.9%	3.2%	3.8%	4.1%	4.4%	4.1%	3.8%	2.5%	0.4%	1.5%
Personal care	6.7%	6.1%	5.8%	6.0%	5.7%	5.5%	5.2%	4.8%	4.2%	1.3%	2.7%
Education	1.8%	1.6%	1.7%	1.7%	1.8%	2.0%	2.5%	2.8%	4.1%	1.9%	2.3%
Communications	0.4%	0.6%	0.8%	1.0%	1.2%	1.5%	1.7%	2.1%	2.5%	1.2%	1.4%
Clothing and shoes	4.1%	5.4%	5.5%	6.4%	6.5%	6.8%	6.7%	6.7%	5.5%	1.5%	3.2%
Domestic goods	0.7%	0.7%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.7%	0.2%	0.4%
Health	1.4%	1.0%	1.2%	1.2%	1.3%	1.6%	2.0%	3.3%	4.5%	2.4%	2.6%
Domestic technologies	0.2%	0.3%	0.4%	0.6%	0.9%	1.1%	1.3%	1.3%	1.2%	0.4%	0.7%
Furniture	0.2%	0.3%	0.5%	0.9%	1.0%	1.4%	1.9%	1.9%	1.9%	0.6%	1.0%
ICTs	0.1%	0.0%	0.1%	0.1%	0.2%	0.2%	0.2%	0.4%	0.6%	0.4%	0.4%
Car, bike, etc.	0.0%	0.1%	0.1%	0.1%	0.2%	0.2%	0.5%	1.0%	2.2%	2.8%	2.2%
Fuel and vehicle maintenance	0.1%	0.1%	0.2%	0.3%	0.5%	0.8%	1.5%	2.5%	5.3%	3.6%	3.2%
Other expenditures	11.2%	9.3%	11.6%	13.8%	15.2%	17.2%	20.5%	20.9%	22.3%	41.7%	33.5%
Communications *	12.9	36	58.9	101.1	153.7	244.4	379.3	658.1	1293.7	3267	620.5
Total *	3098	5545	7441	9789	12525	16270	21784	30867	51981	269570	42887

Source: Own calculations based on data from the Income and Expenditure Survey 2000 (SSA 2000).

* In local currency.

er indicators for access to computers, with 72.6 computers per 1000 inhabitants. But this relatively high access to computers is not reflected in access to the Internet, at least in comparison with Mexico, with only 68 users per 1000 inhabitants against 118 in that country.¹³

Again we see a very high scatter and low R-square of the regression (0.09). In this case it may be explained by the actual distribution of communications spending being bimodal.

In terms of the distribution of expenditure on communications by the different expenditure groups, Table 11 shows that the general tendencies are more or less the same as in the case of the other countries under study. First, we can note that there is an increase in the percentage of general expenditure being devoted to communications as the general expenditure of the family increases but – as is the case in Mexico – this increase reaches its maximum at the IXth decile and then declines by more than half for the decile of highest expenditure. Again the majority of the reduction in the percentage devoted to food and drinks is absorbed by expenditures in both the categories ‘rent and home improvements’ and ‘other expenditures’.

The regression analysis¹⁴ shown in Table 12 indicates that the case of South Africa is similar to that of Mexico and Albania. As shown in model I, urban location of the household is crucial for expenditure on communications, more than doubling it from 0.83% of general expenditure to a 1.78% share. The second model shows that the sex of the head of the household does not have a significant impact on the percentage of expenditure devoted to communications, while location maintains its importance. Finally, in model III we see that while location is still a central determining factor for expenditure, sex and age of the head of the household are also impor-

tant. It is only in the case of households in which the head is more than 60 years old that this impact is more important, contributing 0.52% to the increase in the expenditure on communications.

3. Comparisons between countries

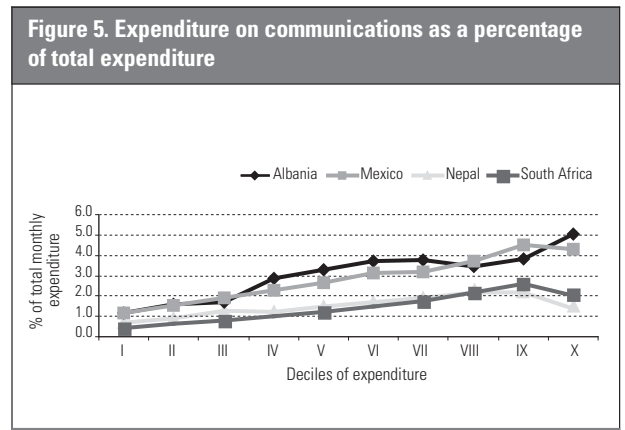
Subsequent to reviewing the results for each country separately, in this section the results for the four countries are compared to establish general trends and to generate hypotheses about expenditure on communications. Figure 5 shows a comparison between the variations in the percentage of expenditure that families devote to communications in terms of the different deciles of expenditure for the four countries. Generally speaking, they all follow the same pattern: as households spend more, consumption of communications occupies a larger proportion of general household expenditure.

It is also interesting to note that while in Albania more expenditure always means a higher percentage devoted to communications, for Mexico, Nepal and South Africa, the percentage of expenditure devoted to communications reaches its maximum at the IXth decile and then declines in the last decile – the 10% of highest levels of expenditure. This situation intuitively seems to echo what we find in industrialised societies, as shown below, but further specific research into the consumption patterns of this segment of the population would be needed to clarify this point.

Table 13 shows the Pearson correlation coefficient¹⁵ for expenditure on communications and the other areas of expenditure for the four countries. The first thing to note is that there is a strong negative relationship between expenditure on communications and food and drinks consumption (above -0.2 in all the countries under study). As the first row shows, for these four countries expenditure on food and drinks is always negatively significant for expenditure on communications. This relationship is graphically presented in Figure 6. In all four countries, an increase in the general expenditure of the house-

		I	II	III
Constant		0.83**	0.79**	0.57**
		[0.24]	[0.29]	[0.03]
Location	Urban = 1	0.95**	0.94**	0.99**
		[0.31]	[0.03]	[0.03]
Sex of head of household	Male = 1		0.73	0.12**
			[0.03]	[0.32]
Age of head of household	40 to 59 years = 1			0.13**
				[0.03]
	Over 60 years = 1			0.52**
				[0.04]
R ²		0.035	0.035	0.041
Observations		26262	26252	25895

Note: ** Indicates a correlation at .001 significance level.
 Note: The standard error is in parenthesis.



hold always results in a decrease in the relative importance of food and an increase in the importance of communications, except on decile 10. In economic terms, this change can be interpreted as the two areas of expenditure having different income elasticities. Income elasticity can be defined as “a measure of the responsiveness to the quantity demanded of any good to a change in the level of income of the persons” (Hamill 2000). If, with an increase in total income of the household, the percentage of income devoted to a given good increases to a higher level (e.g. an increase in 10% of income means an increase of 15% in travel expenses) its elasticity is positive and we can say that the good is a luxury good. On the other hand, if the increase in the percentage devoted to a good is lower than the general increase (e.g. an increase of 10% of income means an increase of 2% in clothing) its elasticity is negative and we can say that we are dealing with a necessity good.¹⁶

In the case of food, Engel's law appears to be operating here: “for any given household composition, Engel's law implies that there is a negative relationship between the food share and the total expenditure” (Deaton 1997). Thus, an increase in one implies a decrease in the other. In other words, more expenditure always means lower relative importance of food in the general family budget, because food is obviously a necessity. In the case of communications the situation is different, because, for all the countries under study, more general expenditure means a greater relative importance of communications. Thus expenditure on communications in these countries has to be seen as a luxury: goods for which families spend money only if their basic needs (such as food and shelter) are already fulfilled. In the case of South Africa, Nepal and Mexico, we may be seeing this luxury status of communication expenditure starting to diminish, becoming something necessary when a certain level of expenditure is reached, but further research would be needed to clarify this point.

Another interesting point is the positive relationship that expenditure on communications has with both ‘travel and tourism’ and with ‘newspapers, books and CDs’. In the first case, the correlation coefficient is as expected due to the fact that travel and tourism always imply a distance from the place of origin, a distance that can be bridged through the use of communications technologies such as the telephone and the Internet. In the second case, it is interesting to see how the consumption of traditional media such as books and newspapers is related to the consumption of ‘new’ media such as mobile phones and the Internet, illustrating that there is certain continuity between the users of both types of media.

Thirdly, it is interesting to note that expenditure on communications is not strongly related to two categories of expenditure where such a relationship might be expected: use of public and private transport and expenditure on ICTs. In the first case, theoretically we might expect a negative correlation between the uses of public and private transport and communications given the idea that ‘virtual’ mobility enabled by the use of communications technologies allows people to save on the cost of travel. In practice, there is a negative relationship in relation to the use of public transport in Albania and Mexico, although not very strong, while in the case of Nepal and South Africa, both expenditures appear to be correlated positively with expenditure on communications. This fact seems to suggest that there is no evidence here to support the idea of a clear replacement between virtual or communicative mobility and physical mobility, something that has been recognised by the literature in the field of mobility (Boden and Molotch 1994; Urry 2002).

For expenditure on ICTs, the positive relationship we might expect between this variable and expenditure on communications – considering that in order to spend on communications we first have to have access to ICTs – only appears to be relatively strong in the case of South Africa (.099) and is quite weak in Albania, while in Mexico and Nepal there is no relationship whatsoever. This result suggests that for developing countries

Table 13. Pearson correlations among percentage of expenditure on communications with all other expenditures by country

	Albania	Mexico	Nepal	South Africa
Food and drinks	-.285(**)	-.269(**)	-.075(**)	-.210(**)
Rent and home improvement	-.135(**)	.025(*)	-.068(**)	-0.001
Water, gas, heating fuel	-0.006		.036(*)	0.009
Public transport	-0.041	-.048(**)	.086(**)	.014(*)
Home maintenance	-.088(**)	-.054(**)	.082(**)	.020(**)
Personal care	.049(*)	-.063(**)	.119(**)	-.027(**)
Education	0.032	-0.016	.060(**)	.027(**)
Newspapers, books, CDs	.111(**)	.087(**)	.085(**)	.077(**)
Entertainment	0.022	.106(**)	.033(*)	.068(**)
Clothing and shoes	0.013	-.044(**)	-0.002	.013(*)
Domestic goods	-0.03	-0.012	-0.005	-0.01
Domestic technologies	-0.022	0.01	0.026	.034(**)
Furniture	.134(**)	-0.016	-0.004	-0.004
ICTs	.051(*)	-0.001	-0.005	.099(**)
Games & toys	.057(*)	0.015	.071(**)	.069(**)
Travel/tourism	.087(**)	.025(*)	.068(**)	.025(**)
Fuel and vehicle maintenance	0.029	.113(**)	.074(**)	.182(**)
Other expenditures	-0.024	0.009	-.053(**)	-.072(**)
N	1780	10079	3906	26263

Note: ** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

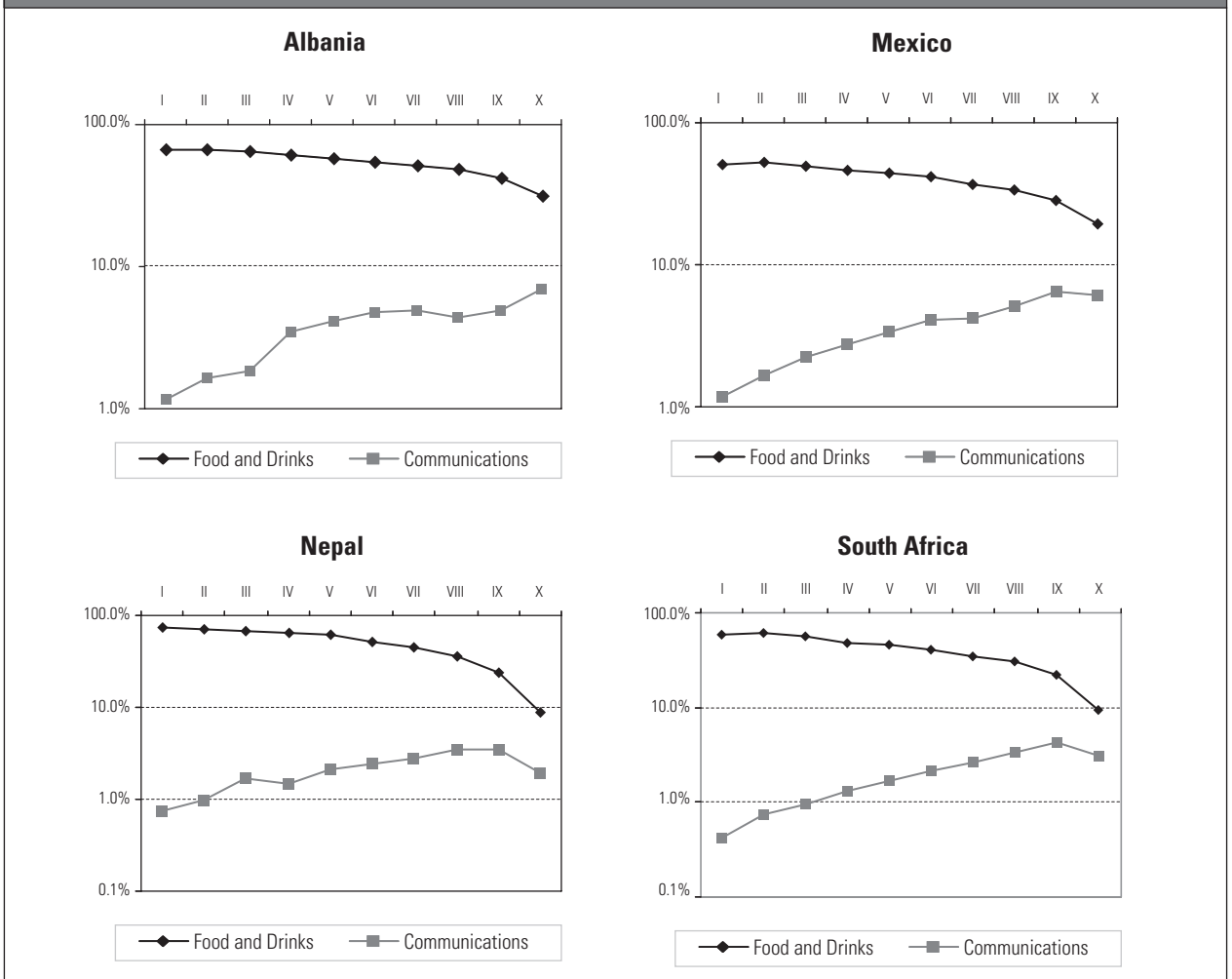
the use of ICTs does not necessarily imply the purchase of technologies for private use such as home computers or personal mobile phones, but instead the use of public devices such as cybercafés or public payphones, as several studies have shown (for some examples see Bertolini 2002; Miller and Slater 2000; and Slater and Kwami 2005). Also, ICT expenditure may well include devices like TVs, video players, etc., which entail little or no continuing outlay after they have been acquired.

Fourthly, there is a general point to be made regarding the high degree of variability of the results. Apart from the significance of the correlation results (or the lack of them) indicated above, expenditure data on communications and its relationship with other areas of expenditure show high degrees of variation, and even contradictions, from one country to another.

In each social setting the use and impact of communications technologies are different and have to be studied as a whole if we want to fully understand the social phenomena surrounding communications technology use in developing countries.

Finally, to consider the results for the four countries in a general context, Figure 7 shows a comparison of expenditure on communications by quintiles of expenditure for the mean of the countries under study and three industrialised countries: the United Kingdom, Singapore and the United States. Variations in the levels of expenditure on communications in the countries follow the opposite trend to those in the industrialised societies. For the first set of countries, increased overall expenditure is always associated with a greater relative importance of communications, while for the industrialised societies the trend is toward decreasing importance of com-

Figure 6. Variation of expenditure on food and drinks and communications in relation to deciles of expenditure



Source: Study construction.

munications in the general expenditure of the household. Following the analysis presented with respect to food, communications expenditure in the industrialised countries seems to be much more of a necessity than in the case of the four countries examined here. In general, these different income elasticities indicate how, in an international context, expenditure on communications does not have a linear pattern, but instead its elasticity changes from positive to negative at a certain point in the development of societies. Finally, it is important keep in mind that this change in income elasticity of consumption does not mean that the populations of industrialised societies spend less money on communications. In fact, absolute statistics show exactly the opposite, at least for OECD countries (Paltridge 2003). It is just that the place that this consumption occupies in general expenditure is smaller. Also, analysis of data for OECD countries suggests that the percentage of income allocated to communications has been increasing over time, although it decreases with income.

4. Conclusions

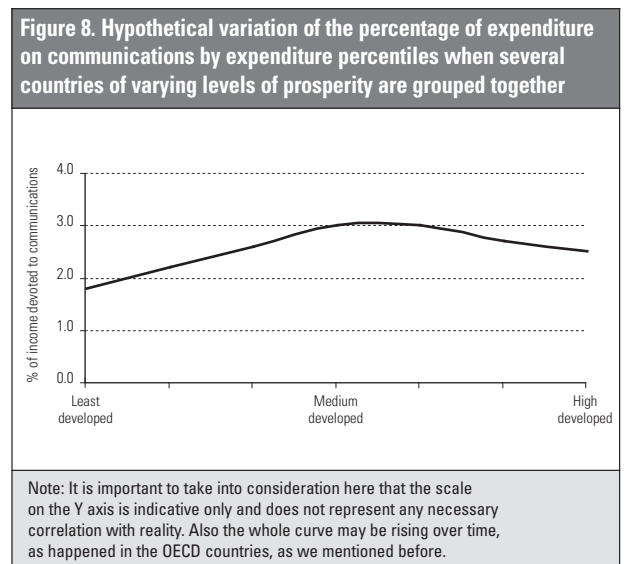
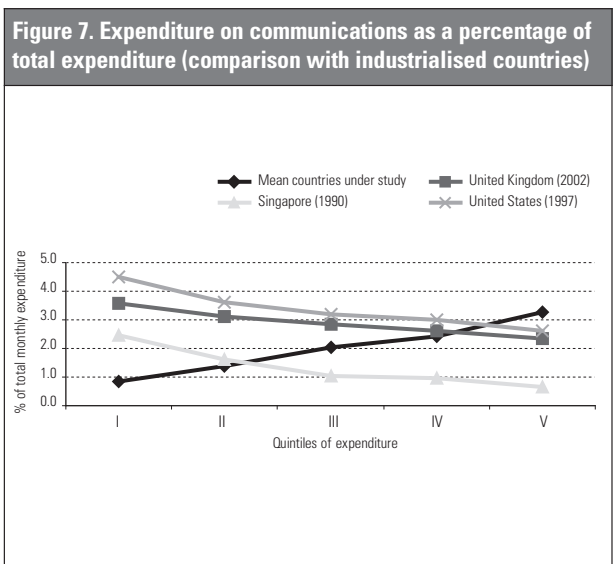
There are several conclusions that we can extract from the analysis of expenditure data presented here. In the first place, and in relation to the place of communications among other types of expenditure, we have to treat the results shown here with caution. Especially for expenditure on food and drink, the observation that communications expenditures have a negative relationship with this variable does not mean that families are spending less on food or drink in order to have money to spend on communications. The analysis of the absolute values presented in Figures 1 to 4 shows the opposite. Families with more expenditure spend more across most of the areas of

expenditure, including food and drink *and* communications, not the other way around. What changes is the relationship between expenditure categories, not the absolute amount of money allocated to them.

The decrease in the relative importance of expenditure on food and drink is only an indicator of a change in general patterns of consumption when there is more money available. It is interesting to note that, as shown for income groups with higher expenditures and in the case of industrialised countries, after a certain point, the proportion of expenditure on communications starts to fall as expenditure on food and drink falls as well. It is interesting to note the continuity between different types of expenditure.

Expenditure on communications does not constitute a completely different kind of expenditure, but forms part of the system of products and services upon which families and individuals use their incomes in everyday life. While food and drink constitute primary necessities, communications can be seen as a second order necessity, followed by other secondary and tertiary needs, which start to become important in terms of their contribution to expenditure when the expenditure of the families becomes higher. The results highlight the relevance of understanding access to communications in contemporary society not as a luxury or something superfluous, but as a need among other needs. Even in the poorest societies, as seen in the case of Nepal, families allocate a certain portion of their income to communications, because using them forms a compulsory part of what it means to live in contemporary societies.

Applying this idea to the international context, we might imagine that the relative significance of expenditure on communications in relation to the level of development of a country might follow a pattern similar to the one shown in Figure 8. After a first stage in which expenditure on communications



has a positive elasticity (i.e. that the relative importance of communications in general expenditure seems to increase with improvement in the well-being of the population) there is a point at which the opportunity cost of using a higher percentage of income on communications becomes larger than its benefits (a saturation point is reached). After this, the elasticity of expenditure on communications becomes negative and any improvement in the expenditure of the household only means that the relative importance of communications is reduced, but that it remains comparatively stronger than in the case of the least developed countries. Even though this idea is only suggestive, more international comparative research, especially between patterns of consumption of developing versus developed countries, would be needed in order to demonstrate its validity in an empirical context.

If the aim is to determine which characteristics household expenditure on communications depend upon, we have to look mainly outside the field of consumption as such. As shown in the regression analysis results, apart from total consumption there are two key variables that are reasonably good predictors of the amount that families spend on communications: location of the household and level of education of the head of the household. With respect to the first, it is interesting to note that despite great advances in mobile communications technologies (especially mobile phones), the strong connection between an urban environment and use of communications technologies still persists. There are many reasons for this including difficulties accessing these services in rural areas and the generally poorer financial condition of rural inhabitants in relation to those in the cities. Still, even in countries with relatively good access to mobile phones such as Albania and South Africa, being located in an urban setting seems to indicate more regular use of this means of communication. With respect to the second point, the relationship is much clearer, because better education means better income and having the intellectual tools to use more complex communications technologies such as computers and the Internet, requiring a certain level of literacy.

Finally, variations in results between countries illustrates that in addition to broad generalisations that can be made about the nature of communications expenditure in developing countries, to acquire a deeper understanding of the phenomena informing the use of communications technologies in developing countries we will have to study each country in depth. Each socio-cultural environment implies different opportunities and constraints for communications technology use and its impact on human development.

Notes

¹ Claire Milne, Visiting Researcher with the Department of Media and Communications and Independent Consultant, directed the research for this paper. Professor Robin Mansell provided comments. We are grateful to all those who provided comments on earlier drafts. We bear full responsibility for any errors or omissions.

² "Telecom Demand: Measures for Improving Affordability" is a project in the Media and Communications Department (media@lse) at the London School of Economics funded by the International Development Research Centre (IDRC), Canada. The original version of this chapter was prepared for the World Dialogue on Regulation for Network Economies (WDR) <<http://regulateonline.org>>.

³ For a complete list of papers ordered by country see <<http://www.worldbank.org/lsms/research/reshome.html#papers>>. Also there is a useful list of related material at <<http://ideas.repec.org/JEL/D12.html>>.

⁴ Much of the work to standardise this kind of survey has been done by the Living Standard Measurement Study (LSMS) of the World Bank. For more information see <<http://www.worldbank.org/lsms/>>.

⁵ This ranking is determined by the average of each country in relation to the four key areas related to the introduction of ICTs: diffusion, connectivity, access and policy.

⁶ It is important to note that the movement from one decile of expenditure to another is not always a result of increasing prosperity but also could be related to an increase in household size, because households with more members spend more. This does not necessarily imply that their situation becomes any better; often the opposite is true (as happens in overcrowded houses). This also means that if we were able to repeat this analysis looking only at per-capita expenditure the relationship between prosperity and expenditure might be even more important.

⁷ It is important to note that all these explanatory variables are more or less interrelated to a certain degree (e.g. higher degrees of education generally can be found among urban households rather than rural) and that it is not possible to fully individualise the effect of each one of them.

⁸ This refers to "uneven patterns in the adoption of technologies that lead to some segments of the business and residential sectors using most advanced tools while others work with obsolete or traditional paper methods" (Garcia-Murillo 2003: 2).

⁹ This can be explained by the fact that the survey was conducted in 2000 and the rates of growth of the mobile market, especially in the developing world. For example, the three-year difference between Nepal and Albania has to be taken into consideration.

¹⁰ A parallel analysis of the Nepalese data showed that overall 43% of rural Nepalese without a home phone had non-zero communications spending. However this percentage rose to 52% for those within a 30-minute journey of a phone booth and fell to 31% for those whose journey to a phone booth was two hours or more.

¹¹ The parallel analysis referred to suggests that total communications spending could more than double if everyone had access to phones.

¹² Something that is probably influenced by the distance they must cross in order to access public payphones. As further analysis on Nepal NLS2 has shown "more than half of the households of the first and second poorest quintiles of the populations, mostly rural, have to travel more than half an hour to reach the nearest payphones, but "if phone booths were easily accessible to all at current prices, it is estimated that total spending at them would more than triple."

¹³ This can be explained partially by the observation that, along with the lack of infrastructure in rural areas, when it is available “the cost of ADSL in South Africa is 139% more expensive than the average price out of [other comparable countries in terms of communication costs]” (Gillwald 2005:10).

¹⁴ In this case, there are only three models due to lack of data for the variable indicating education in the original data set.

¹⁵ Pearson correlation shows the degree of linear relationship between two variables. It ranges from +1 to -1. A correlation of +1 means that there is a perfect positive linear relationship between variables. A correlation of -1 means that there is a perfect negative linear relationship between variables.

¹⁶ It is important to keep in mind here that these are strictly economic definitions of ‘luxury’ and ‘necessity’ which do not necessarily match common sense understandings of them.

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ICT Usage and its Impact on Profitability of SMEs: A case of eight African countries

Steve Esselaar, Christoph Stork, Ali Ndiwalana & Mariama Deen-Swarray

1. Introduction

This chapter reports on a small and medium-sized enterprise (SME) survey carried out by the Research ICT Africa! network (RIA) in 14 African countries. The SME E-access and E-usage Index (RIA 2006) works toward better understanding the impact of ICTs on private sector development, and how ICTs can contribute to a vibrant SME sector and economic growth in the context of developing economies.

The analysis presented here is based on the results of only eight of the 14 countries. The data for the remaining countries had not been processed at the time of writing. The data currently covers Cameroon, Ethiopia, Ghana, Kenya, Namibia, South Africa, Tanzania, and Zimbabwe.

The SME sector has an important role to play in economic development, poverty reduction and employment creation in developing economies (see Hallberg 2000). It is the sector in which most of the world's poor people are working (Stern 2002). The sector largely exceeds the average economic growth of national economies in many countries and contributes significantly to employment creation. Accordingly, governments and donors alike have recognised the important role of the SME sector for overall development. As a result, many government policies are geared towards supporting SME sector growth through a variety of programmes that range from tax incentives to technical assistance, from regulatory provisions to policy interventions, training and other types of business development services (O'Shea and Stevens 1998).

The SME E-access & E-usage Index¹ considers demand side ICT usage, with the objectives of identifying obstacles faced by SMEs in their daily business activities and providing guidance in creating relevant policy initiatives that lead to more economic growth and employment. This chapter presents key

results from this survey and offers insights for development economists and policymakers working in the field of private sector development.

2. Methodology

The target sample for each country was 280 SMEs. The SMEs were sampled based on target lists in the capital of each country and two other economically significant urban locations. No random sampling procedure was used but the businesses were selected based on their profile.

Tremendous effort was undertaken to train enumerators to understand the value preposition of a business, i.e., to understand how the business makes its money. Gathering financial information from SMEs is not an easy task. Enumerators must build trust with the entrepreneurs and develop an understanding of how businesses operate. Several control questions were built into the questionnaire to verify consistency of responses given during the interviews. These allowed enumerators to detect provision of wrong or inaccurate information.

Entrepreneurs providing inaccurate information, other than for fear of higher taxation or competition, was due to the absence of record keeping. Enumerators were trained to assist SMEs without record keeping to estimate the values of fixed assets and other financial figures.

Implied purchasing power parity (PPP) conversion rates² were used to convert monetary values to USD for all countries. This conversion permits the creation of one dataset based on the data from various countries.

2.1 SME definition

SME definitions vary from country to country and are ideally defined specifically according to sector. The size cut-off point for this survey is based on a recommendation from the African Development Bank, which defines SMEs as having fewer than 50 employees.³ The International Labour Organization (ILO 2004) distinguishes three types of enterprise models: pre-entrepreneurial activities, micro-enterprises and small enterprises.

This chapter distinguishes between survivalists or informal operators and businesses. Survivalists or informal operators engage in business activities with the aim of generating enough income for day-to-day consumption, rather than growing a business that generates a sustainable stream of income. Survivalists or informal operators usually do not distinguish between business and personal finances, do not keep records, do not pay taxes and are not registered with any

authority. Money from sales or services rendered is predominantly consumed immediately for private purposes (same day, week or month). A micro and small business in contrast has some degree of formality. This might include a business bank account, formal work contracts for employees, a physical address with contact details, registration with receiver of revenues and other authorities and so forth. The line between informal operators and survivalists on the one hand and informal businesses on the other is fluent and varies from country to country. The distinction between formal and informal businesses also varies from country to country.

Only businesses that complied with the following characteristics were sampled:

- Physical presence (shop, workshop, house where the business is operated from) with contact details (a minimum of two out of these three: street number, post box, telephone/cellphone number);
- Business operates with the aim of generating sustainable income streams;
- Business is independent, i.e. not a branch of a larger business;
- Business has fewer than 50 employees.

2.2 Sample

A qualitative question regarding the business activity was asked and the responses used to classify SMEs according to the International Standard Industrial Classification (ISIC). The number of sampled businesses for different ISIC clusters is shown in Table 2. The analysis of this chapter is based on the responses of 2187 SMEs.

Informal Operator/Survivalist	1. No employees 2. Does not distinguish between business and personal finances 3. Does not keep records 4. Does not pay taxes 5. Is not registered with any authority 6. Engages in business activities to pay for daily and weekly expenses
Informal Micro or Small Business	7. Fewer than ten employees 8. May not distinguish between business and personal finances 9. May not keep records 10. May not pay taxes 11. May not be registered with any authority 12. Has physical address and contact details
Formal Micro or Small Business	13. Between ten and 49 employees 14. Keeps records 15. Has separate bank account 16. Pays taxes 17. Is registered with all required authorities 18. Has physical address and contact details

Tabulation	South Africa	Tanzania	Zimbabwe	Cameroon	Ethiopia	Ghana	Kenya	Namibia	Total
D: Manufacturing	35	57	48	52	49	66	57	70	434
F: Construction	19	17	17	32	6	19	13	22	145
G: Wholesale and retail trade repair of motor vehicles	57	94	100	77	108	85	88	108	717
H: Hotels and restaurants	12	13	17	20	18	21	18	14	133
I: Transport, storage and communications	12	32	28	31	23	28	27	40	221
J & K: Financial intermediation & real estate, renting	47	20	34	33	37	26	34	12	243
M & N & O: Education, health, social work, other community	35	30	37	35	41	35	40	41	294
Total	217	263	281	280	282	280	277	307	2187

2.3 Formality Index

The data collected from SMEs was used to classify responding SMEs into informal, semi-formal and formal businesses. Table 3 shows the variables contributing to the formality index.

PTYs and CCs usually require registration with various ministries such as finance and/or trade and industry, whereas sole proprietors and partnerships do not necessarily need to be registered with either in most countries surveyed. An SME registered for Value-Added Tax (VAT) is also more likely to be formal than one that is only registered for income tax since VAT handling requires sophisticated record keeping. Having written employment contracts for employees also contributed toward the formality index. Having a written contract allows employees to enforce the rights and minimum wages as stipulated in labour laws while those without contracts can often be hired and fired at will. Whether a business strictly separates personal from business finances and the sophistication of record keeping and accounting was also included in the formality index.

The maximum value a business could achieve in terms of the formality index is 4.5. Businesses were then categorised into informal, semi-formal and formal. The breakdown of this classification is shown in Table 4, and Table 5 displays the breakdown of the sample in terms of formality categories and countries.

2.4 Usage indices

Three indices are computed to compare ICT usage across formality categories with each other: the ICT Possession Index, the ICT Usage Index and the ICT Usage Intensity Index. The

Question	Value	Index Points
D.1 Form of ownership?	Sole proprietor, partnership	0.0
	CC, Pty	0.5
D.3 Is your business registered with the Receiver of Revenues? (Does it pay tax?)	No	0.0
	Yes	0.5
D.4 Is your business Registered for VAT?	No	0.0
	Yes	1.0
D.11 How many of your employees have a written employment contract?	None	0.0
	One or more	1.0
D.12 Does your business strictly separate business finances from personal finances?	No	0.0
	Yes	0.5
D.14 Does your business keep financial records?	None	0.0
	Simple bookkeeping	0.5
	Double entry bookkeeping	1.0
	Audit annual financial statements	1.0
Maximum Total		4.5

ICT usage intensity among businesses is calculated using the ICT Usage Index and dividing it by the ICT Possession Index. ICT usage intensity shows the extent to which businesses employ ICT for business purposes in terms of what they have in ICT devices.

The ICT Possession Index considers what businesses have in terms of ICT equipment and facilities. One point is given for each ICT device owned by a business and a maximum of six points is obtained should a business have all six items. Table 6 shows how this index is calculated.

The ICT Usage Index was developed by awarding one point for any employment of ICT facilities and equipment to carry out business transactions. This gave a maximum total of 15 points should a business be making use of all the ICT facilities and equipment mentioned in this study for business purposes. This is shown in Table 7.

Formality Index	Index points
Informal	1.5 points or below
Semi-formal	2 points or more and less than 3.5 points
Formal	3.5 or more points

	Informal	Semi-formal	Formal	Total
South Africa	30	56	131	217
Tanzania	22	127	114	263
Zimbabwe	50	67	164	281
Cameroon	172	75	33	280
Ethiopia	99	132	51	282
Ghana	70	93	117	280
Kenya	63	107	107	277
Namibia	75	116	116	307
Total	581	773	833	2187

	Index value
Yes, the business has one or more working telephones	1
Yes, the business has one or more working mobile telephones	1
Yes, the business has one or more working fax machines	1
Yes, the business has one or more post boxes	1
Yes, the business has one or more working computers	1
Yes, the business has an Internet connection	1
Maximum Value	6

	Index value
Yes, the business uses the telephone to communicate with clients and customers	1
Yes, the business uses the telephone to order supplies	1
Yes, the business uses the mobile to communicate with clients and customers	1
Yes, the business uses the mobile to order supplies	1
Yes, the business uses the fax to communicate with clients and customers	1
Yes, the business uses the fax to order supplies	1
Yes, the business uses the post box to communicate with clients and customers	1
Yes, the business uses the post box to order supplies	1
Yes, the business uses the computer to communicate with clients and customers	1
Yes, the business uses the computer to order supplies	1
Yes, the business uses the Internet to communicate with clients and customers	1
Yes, the business uses the Internet to order supplies	1
Yes, the business sends SMS or text messages for business purposes	1
Yes, the business receives SMS or text messages for business purposes	1
Yes, the business uses the Internet for business purposes	1
Maximum Value	15

	Fixed Line Phones	Mobiles	Fax	Post Box	Computer	Internet Connection
Do not have it but think it would be important or very important for my business	60.4%	70.6%	32.3%	27.8%	52.1%	43.4%
Have it and think it is important or very important for my business	99.0%	99.0%	94.5%	80.8%	97.8%	94.3%
Average	83.5%	95.5%	51.0%	61.9%	72.1%	55.6%

3. ICT usage

The role of mobile phones in maintaining customer relationships is clear from the survey. Mobile phones are used more often for keeping in contact with customers and clients compared to any other form of communication: 73% of SMEs in the sample used the mobile phone for this purpose compared to 51% using fixed line telephones. However, the difference is not so dramatic when ordering supplies, something that can be done using a fixed line phone more easily since this can be an occasional occurrence. Nevertheless, there is a difference with 49% of SMEs using mobile phones compared to 40% using fixed lines.

The crossover between business and personal is also more pronounced amongst mobile phone users compared to fixed line phone users. Compared to 52% of mobile phone users, 28% of SMEs use a fixed line phone for personal use. This could also mean that the mobile phone is more seen as a shared resource compared to the fixed line phone.

Amongst those SMEs that do not own a fixed line phone but do own a mobile phone, a much higher percentage think that there is no need to own a fixed line phone than the reverse (i.e. those that think they do not need a mobile phone). Some 16% of SMEs believe that there is no need to own a fixed line phone, compared to 7.5% who believe there is no need to own a mobile phone. Adding to the perception that mobile phones play a more important role within SMEs is the perception that fixed line phones are too expensive with 14% of SMEs stating that fixed line phones are too expensive, as compared to 7% stating that mobile phones are too expensive. Interestingly, of the SMEs that do not have a fixed line phone, over 8% state that it is a service that is not available in their area, compared to just over 1% who say the same regarding mobile phones.

A fixed line phone is rated as important or very important by 84% of SMEs rate compared to 96% that rate a mobile phone as important or very important for their business activities.

It is a truism to say that SMEs have constrained resources. Practically, this means that there is a strong focus on those tools that have an immediate benefit, compared to those with a more long-term benefit. The advantage of the mobile phone, for example, is two-fold: it can easily be used with little training; and an increasing number of people have a mobile phone (creating network externality effects). Other forms of ICTs, such as fax machines and post boxes, do not share these two key features and therefore their take-up is lower.

Ease of use and widespread use also account for why over 70% of SMEs that do not have a mobile phone state that it would be very important for business – a higher percentage than any other category.

Of all ICTs used by SMEs, mobile phones are seen as vital across the range of formal and informal businesses. Mobile phones score almost exactly the same in both the informal and formal sectors. In contrast, there is a positive relationship between the degree of formality and all the other forms of ICTs. The largest gaps between informal and formal businesses in terms of the importance of ICTs include fax machines, post boxes and Internet connections.

While a quarter of SMEs believe that there is no need to own a computer, a quarter also believe that they are too expensive. This jumps to a higher percentage on both counts when taking computers with Internet connections into consideration. Some 33% of SMEs believe that there is no need for a computer with an Internet connection and 32% believe that they are too expensive. It seems likely that there is a correlation between those that say it is too expensive and those that say there is no need for the technology, but this would have to be further investigated. The role that cybercafés play in supporting SMEs is underscored by the fact that 14% of SMEs that do not have an Internet connection do use cybercafés.

Computers are rated as important to very important by 52% of SMEs, but this drops dramatically when rating the importance of an Internet connection. 43% believe that an Internet connection is important to very important. Clearly, the mobile phone has overtaken the computer as the most practical tool for running a business. However, the mobile phone clearly has its limitations because 27% of SMEs without access to computers anticipate using them in the future and a further 30%

Table 9. SMEs that stated a particular ICT item is either important or very important for their business operation, distinguished by their degree of formality

	Fixed Line Phones	Mobiles	Fax	Post Box	Computer	Internet Connection
Informal	66.8%	95.4%	23.1%	37.9%	49.5%	32.4%
Semi-formal	82.5%	95.2%	44.4%	61.9%	71.9%	55.2%
Formal	95.5%	95.9%	75.6%	77.9%	87.4%	72.3%
Average	83.5%	95.5%	51.0%	61.9%	72.1%	55.6%

anticipate using the Internet in the future. This speaks to the possibility that computer and Internet usage compared to mobile phone usage is a question of cost and accessibility rather than usefulness.

The results of the Kruskal-Wallis Test for the mean comparisons for ICT Possession, ICT Usage and ICT Usage Intensity indicate that there is a significant difference in the mean ranks for all three indices across formality.

Formal SMEs possess more ICT equipment and make more use of it than semi-formal ones; and semi-formal SMEs more than informal ones. However, informal SMEs have the highest ICT Usage Intensity, followed by the semi-formal ones, with the formal SMEs having the least.

The high ICT usage in the formal sector can be attributed to their higher employment of such facilities in carrying out business activities. Owners of informal businesses are also on average less educated compared to owners of semi-formal and formal SMEs, as shown in Figure 1.

Lack of knowledge of how to use computers and accounting packages prevents many informal business operators from using them, apart from financial constraints. This could, for example, be overcome by developing SMS-based business applications since most people are familiar with and have access to mobile phones (Moyi 2003). The higher ICT usage intensity of informal SMEs also points in that direction.

Table 10. Mean rank comparison using Kruskal Wallis Test for ICT Possession, Usage and Usage Intensity Indices with grouping variable = formality

	Formality Categories	N	Mean Rank	Chi-Square	df	Asymp. Sig.
ICT Possession Index	Informal	581	661.00	629.930	2	0.000
	Semi-formal	773	999.10			
	Formal	833	1484.07			
	Total	2187				
ICT Usage Index	Informal	581	690.32	554.289	2	0.000
	Semi-formal	773	995.41			
	Formal	833	1467.05			
	Total	2187				
ICT Usage Intensity Index	Informal	501	1169.06	45.661	2	0.000
	Semi-formal	735	1036.43			
	Formal	825	942.32			
	Total	2061				

4. ICT impact on profitability

Informal businesses have a higher profitability in terms of fixed assets employed than semi-formal ones, and semi-formal ones a higher profitability than formal businesses as shown in Table 11.

Profitability is defined as after-tax profits (which is the same as pre-tax profits for most informal businesses) divided by the total value of fixed assets.

The Kruskal Wallis test shows that the result obtained is significant. This supports the intuition that informal businesses usually operate at a far higher gross profit than formal ones. They are not bound to minimum wages, can hire casual labour whenever needed, pay mostly no tax and operate on less infrastructure than formal businesses. Health regulations require,

for example, separate toilets for males and females for any bar or restaurant. Many informal bars (shebeens) in Botswana, South Africa, Namibia and Zambia do not have toilets at all. Operating informally also means paying less or no rent.

Chowdhury and Wolf (2003) used modified Cobb-Douglas production functions to investigate labour productivity and returns for a survey conducted in Tanzania and Kenya. Their main findings are:

- No significant impact of ICT investments on return performance of SMEs; and
- A negative impact of ICT investments on labour productivity.

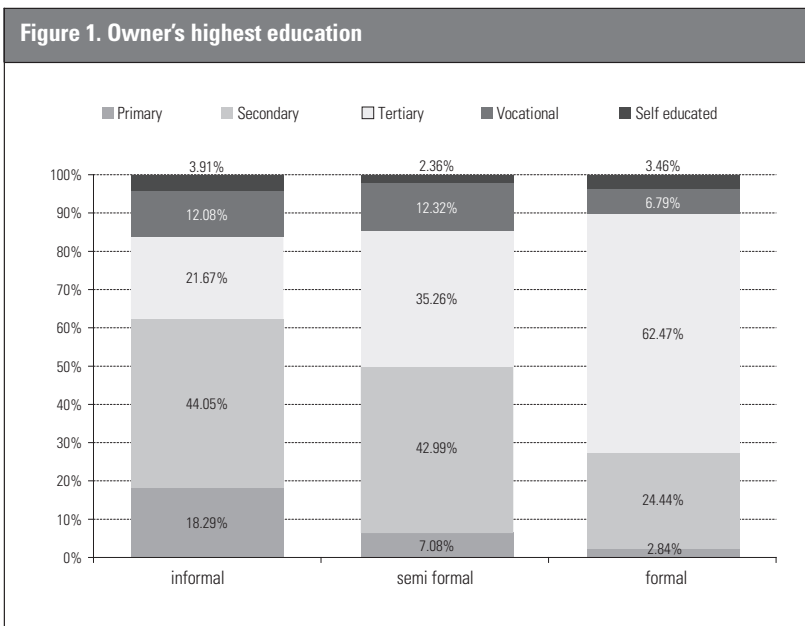
These results ignore the fact, however, that informal businesses are likely to have less ICT equipment than formal ones, yet their profitability is higher as shown in Table 11.

Also, using production functions might not be an appropriate approach for dealing with SMEs. Production functions assume a certain relationship between inputs and outputs (Fandel 2005). Most SMEs are not producing one product or service but more or less anything that makes money. An Internet café might also offer tailoring and hair salon services. A lock and key smith can also fix cars or do spray painting. It is often difficult to judge whether an SME is a manufacturing, service or retail/wholesale business since borders lines are fuzzy.

Wolf (2001) notes that the focus on production processes might be too narrow and that ICTs might exert their influence through product quality improvements and improved services. ICTs might additionally help SMEs in the administration of their businesses and enhance procurement and marketing processes.

Table 11. Mean rank comparison of profitability (after-tax profit divided by total fixed assets) by formality categories

	N	Mean Rank
Informal	520	1081.15
Semi-formal	706	975.11
Formal	760	950.61
Total	1986	
Kruskal Wallis Test Grouping Variable: formality index categories	Chi-Square	17.127
	df	2
	Asymp. Sig.	.000



This chapter therefore focuses on SMEs as business entities rather than on particular production processes. Turnover functions and profitability are used to measure the impact of ICTs on the profitability of SMEs. Any analysis is carried out separately for SMEs of different formality classification. A turnover function can be specified as follows:

$$F_1 = \beta_1 + \beta_2 F_2 + \beta_3 F_3 + \beta_4 F_4 + \beta_5 F_5 + \beta_6 F_6 + \varepsilon$$

with

F_1 = Turnover

F_2 = AVERAGE water, electricity cost

F_3 = AVERAGE cost for premises in terms of rent, land taxes mortgage payments

F_4 = AVERAGE business expenditure on telephone calls, fax, postage, Internet

F_5 = AVERAGE wage bill

F_6 = AVERAGE direct cost (raw materials and other intermediary inputs or goods bought for resale)

The results from a regression analysis are summarised in Table 12. The adjusted R Square for informal and semi-formal SMEs is above 0.9. The weak adjusted R Square for formal SMEs points to the necessity to distinguish for sectors and countries. This shall be done as soon as the data from the remaining six countries has been incorporated.

The Durban-Watson statistics indicate no problem with auto-correlation and the F-test shows significance for all three equations.

Going into more detail shows no problems with multicollinearity either (Tables 13 to 15). The Variance Inflation Factor (VIF), which indicates whether a predictor has strong linear relationship with other predictors, is not greater than 10 for any of the predictors. According to Myers (1990) and also Bowerman and O’Connell (1990) this is an indication that there is no concern. Looking alternatively at the tolerance, which are all above 0.2 indicate no potential problem (Menard 1995). This is somewhat surprising since multicollinearity is to be expected for turnover functions since in production relationships output over time is a function of the amounts of various quantities of inputs employed (Hill et al. 1997). The lack of it

Table 12. Regression results for turnover equations

	R	R Square	Adjusted R Square	Standard error of the estimate	Durbin-Watson	F	Sig.
Formal	0.399	0.159	0.154	\$51,904,613.57	1.97	31.121	0.000
Semi-Formal	0.954	0.909	0.909	\$377,392.87	1.893	1535.99	0.000
Informal	0.966	0.933	0.932	\$266,679.54	2.037	1535.99	0.000

might be explained by the diversity of SMEs in each category, which spans across manufacturing, construction, wholesale and service businesses.

However, only the coefficients for informal and semi-formal businesses are significantly positive. The differentiation of

Table 13. Regression results for formal turnover function

Formal	Unstandardised Coefficients	t	Sig.	Collinearity Statistics	
	B			Tolerance	VIF
(Constant)	3.205.591.911	1.695	0.090		
PPP WHAT ARE AVERAGE DIRECT COST (Raw Materials and Other Intermediary Inputs or Goods Bought for Resale)?	-0.272	-0.388	0.698	0.346	2.891
PPP WHAT ARE AVERAGE wage bill	11.405	6.75	0.000	0.308	3.246
PPP WHAT DOES YOUR BUSINESS SPEND ON TELEPHONE CALLS, FAX, POSTAGE, INTERNET ON AVERAGE?	29.896	1.535	0.125	0.701	1.426
PPP What is THE AVERAGE cost for your premises in Terms of Rent, Land Taxes, Mortgage Payments ?	1.555	0.176	0.860	0.714	1.401
PPP WHAT ARE YOUR AVERAGE WATER & ELECTRICITY COSTS?	-3.612	-0.386	0.700	0.977	1.024

Table 14. Regression results for semi-formal turnover function

Semi-formal	Unstandardised Coefficients	t	Sig.	Collinearity Statistics	
	B			Tolerance	VIF
(Constant)	-6.930.549	-0.459	0.646		
PPP WHAT ARE AVERAGE DIRECT COST (Raw Materials and Other Intermediary Inputs or Goods Bought for Resale)?	2.140	62.368	0.000	0.697	1.434
PPP WHAT ARE AVERAGE wage bill	1.380	9.944	0.000	0.620	1.613
PPP WHAT DOES YOUR BUSINESS SPEND ON TELEPHONE CALLS, FAX, POSTAGE, INTERNET ON AVERAGE?	3.527	11.921	0.000	0.876	1.142
PPP What is THE AVERAGE cost for your premises in Terms of Rent, Land Taxes, Mortgage Payments ?	2.890	3.720	0.000	0.836	1.197
PPP WHAT ARE YOUR AVERAGE WATER & ELECTRICITY COSTS?	3.019	4.749	0.000	0.966	1.035

the formal businesses by ISIC categories at a later point in time should allow deeper insights into the relationship between ICT expenditure and turnover. Table 16 shows the results of a different type of analysis. Here the correlation between profitability, measured as after-tax profit divided by value of fixed assets, and value of ICT assets, relative to the value of total fixed assets, is analysed.

All correlation coefficients are significantly positive. Correlation coefficients, however, do not say much about the direction of causality. Businesses might purchase more ICTs as a consequence of good profits or their profitability might increase due to ICT usage. However, combining the correlation results with the results from the turnover equations makes a substantive case for the latter.

Table 15. Regression results for informal turnover function

Semi-formal	Unstandardised Coefficients	t	Sig.	Collinearity Statistics	
				Tolerance	VIF
	B				
(Constant)	18.764.371	1.503	0.133		
PPP WHAT ARE AVERAGE DIRECT COST (Raw Materials and Other Intermediary Inputs or Goods Bought for Resale)?	1.481	72.887	0.000	0.596	1.679
PPP WHAT ARE AVERAGE wage bill	2.632	8.787	0.000	0.549	1.823
PPP WHAT DOES YOUR BUSINESS SPEND ON TELEPHONE CALLS, FAX, POSTAGE, INTERNET ON AVERAGE?	12.726	4.794	0.000	0.629	1.589
PPP What is THE AVERAGE cost for your premises in Terms of Rent, Land Taxes, Mortgage Payments ?	-9.851	11.717	0.000	0.509	1.964
PPP WHAT ARE YOUR AVERAGE WATER & ELECTRICITY COSTS?	6.778	11.695	0.000	0.826	1.211

Table 16. Pearson Correlation between (after-tax profit / value of fixed assets) and (ICT assets / value of fixed assets) by the degree of formality

	Pearson Correlation	N	Sig. (2-tailed)
Informal	.196	433	.000
Semi-formal	.171	619	.000
Formal	.205	730	.000

5. Obstacles to ICT adoption

The biggest obstacle to wider ICT usage was identified as the high costs of ICTs. This points clearly to the necessity to implement regulatory and policy changes with the aim of reducing the cost of ICTs in order to foster economic growth and employment.

The second most severe obstacle to ICT adoption was identified as the lack of awareness and knowledge about what ICTs can do to help businesses to become more efficient in their operation. This was particularly relevant for informal SMEs for which 15% of the businesses indicated this as the main obstacle to ICT adoption as compared to about 10% for semi-formal and formal SMEs. Informal businesses also perceived lack of financial resources as the main obstacle – twice as often compared to semi-formal and formal businesses.

6. Conclusion

The role of SMEs in promoting economic growth is gaining increasing recognition. In South Africa, it has been estimated that nearly 25% of its fixed capital formation is to be found in the SME sector (Berry et al. 2002). A similar picture emerges for Namibia (Stork et al. 2004a; 2004b). However, the precise role of SMEs in providing employment and contributing to poverty alleviation remains unclear. Part of the problem is that there is a paucity of data around SMEs. For nearly all of the countries in this survey, there is no centralised database on SMEs making representative surveys very difficult. Also, there is a general lack of basic statistics, such as how much employment SMEs provide, their average turnover, profitability, life-span and product range. Finally, of the SME surveys that have been done, the most conclusive have focused on issues such as access to capital and financial intermediation – correctly

Table 17. Main obstacles to ICT usage stated by SMEs from eight of the sampled countries

	Informal	Semi-formal	Formal	Total
High costs, too expensive	56.25%	61.39%	52.80%	56.77%
Lack of awareness & knowledge regarding ICTs	15.10%	10.23%	9.58%	11.27%
Lack of financial resources to purchase ICTs	13.54%	6.56%	5.24%	7.90%
Network problems / Unreliable infrastructure	5.21%	6.76%	7.96%	6.80%
Lack of skills & ICT illiteracy	2.08%	5.60%	5.42%	4.60%

assuming that a key concern for any business is how to find additional capital to expand.

Until now, investigation has largely ignored the fundamental role that ICTs can play within the SME sector. In the 1990s to just after the dot.com bubble in 2000, there was a general perception that the provision of ICTs to SMEs (and to individuals for that matter) would have a transformative effect. Clearly, the current view is more pragmatic. ICTs are now supported for the catalytic role that they can play within sectors of the economy. Within the SME sector, ICTs play a role in reducing transaction costs (thereby increasing efficiency) and increasing market access. For example, new financial products are increasingly based on mobile or Internet platforms. Finding new products, increasing customer awareness of the products available and sourcing new markets are considerably easier using ICTs.

This chapter has reported on the SME Survey carried out by the Research ICT Africa network in eight African countries. The chapter demonstrates that the negative impact of ICTs on labour productivity reported in the literature as well as the lack of significant impact on company performance can be attributed to the failure to distinguish between the formal and informal sector. Using a formality index, we classify respondent SMEs into informal, semi-formal and formal businesses.

While it is clear ICTs are input factors for both formal and informal SMEs with a positive correlation to profitability, use of ICTs might be the cause or a result. ICTs could be the result in the sense that SMEs purchase more ICTs as a consequence of good profits or a cause in the sense that SME profitability increases due to ICT usage. A combination of sector turnover production functions and the correlation between profitability and value of ICT assets relative to the value of total fixed assets suggests that the latter scenario is the more likely.

We found that informal businesses have a higher profitability in terms of fixed assets employed than semi-formal ones, which in turn have a higher profitability than formal businesses. This is understandable, given that increasing formality encumbers a business, ensuring that it must follow certain laws in its operation.

The impact of these findings from a policy point of view requires further study which is beyond the scope of this study. However, there are some observations and recommendations. Firstly, the mobile phone has overtaken the computer as a tool in supporting the running of a business. Given their prevalence and accessibility, well-designed phone or SMS-based business applications may have an impact on the profitability of SMEs.

Secondly, the traditional focus on formal businesses, particularly in terms of financial support, undermines the role that the informal sector plays in the economy. The fact that it is more difficult to measure does not lessen its impact. In this light, the fact that informal businesses are more profitable than formal ones raises the issue that some businesses might prefer to be out of the formal environment. The move towards mobile telephony given its (current) limited functionality might indicate that the benefits of moving into the formal economy are

outweighed by its costs. A focus on the reduction of input costs of informal businesses (such as ICT costs) could encourage a faster migration from informal to formal sector.

Thirdly, the focus upon mobile technology is both an advantage and a disadvantage. It is an advantage because it provides an SME with a low cost base yet the ability to communicate with suppliers and customers very easily. It is a disadvantage because of its limited functionality in terms of its ability to develop as an SME develops. At present, mobile phones cannot be used to track inventory, provide cash flow and income statements, or even more basically, produce formal letters, marketing campaigns or brochures. A policy focus should be to either encourage the development of SME-specific tools for mobile handsets or to encourage lower ICT (specifically computer) costs.

This chapter has attempted to contribute to the growing debate on the role of SMEs within a developing country economy. It finds that the informal sector is conflated with the formal sector or ignored, with substantially negative policy effects given the role of the SME sector in terms of contributing to economic growth and poverty alleviation.

Notes

¹ See: <<http://www.researchICTafrica.net>>.

² See: <<http://www.imf.org>>.

³ Sector specific definitions will be derived from the analysis collected in the survey and presented in a future paper.

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Section 2

Models to Extend Participation in Network Development

This section examines alternative models of network ownership, management and financing, with a particular focus on local participation and rural communities. Despite the vast resources invested over the past decade, telecom networks and services have failed to effectively reach rural areas in developing countries, where sparse populations and low incomes mean that conventional approaches have been unattractive to national public and private monopoly providers.

As illustrated in Section 1, where networks do reach, coverage does not necessarily result in access since poorer sections of the community often simply cannot afford to use them. Additionally, mobile telephony is only able to deliver a limited spectrum of applications and services. Attempts to address the problem by pooling demand in telecentres or cybercafés have had some success, but results to date are uneven and these centres often do not address the development needs of the poor, women or other marginalised groups, especially if they are not specifically mandated to do so.

Although locally owned networks may benefit from financial advantages such as free rights-of-way or in-kind contributions from community members (labour, use of community-owned buildings, etc.), their small size and not-for-profit objectives can impede their access to credit sources available to traditional operations. Large-scale infrastructure development loans of the type offered by the World Bank are not available to community-sized operations and cooperatives. Also, not for profit operations can face legal hurdles to borrowing or banking cultures that clash with the non-profit service-oriented objectives

of community enterprises and these may require alternative financial arrangements. When traditional banks balked at providing loans in Argentina, cooperatives found allies in the country's well-developed network of credit unions. In Bangladesh it was the micro-credit Grameen Bank that financed the community-driven extension of GSM to rural Bangladesh. And in Peru community-owned networks were able to tap into universal access funds.

To extend the parable of teaching a person to fish, there may be downstream constraints on the ability to subsequently purchase the tools of the trade. A loan may be necessary to be able to acquire the necessary implements to practice this new skill. The Grameen Village Phone (VP) program via such loans has successfully extended telecom access to over 45 percent of the villages in Bangladesh. The microfinance scheme allows villagers to purchase a mobile phone and a GrameenPhone connection, which is then operated as a payphone, providing access to fellow villagers for a charge. This is particularly impressive in a country that had 3.44 telecom (fixed plus mobile) subscribers per one hundred inhabitants in 2004. The VP program has been hailed as a unique case in developing and extending rural telecom infrastructure.

Chapter 6, by **Malathy Knight-John, Ayesha Zainudeen and Abu-Saeed Khan**, examines the particular sets of solutions that have emerged for the extension of telecoms access to marginal customers in Bangladesh, under the Grameen program. The extremely successful Grameen business model is grounded in the organisation's intention to promote development and

poverty alleviation through the use of ICTs and to increase telecom access to the rural poor. This case study attempts to discern the factors that have contributed to the program's success, including the roles of microfinance and infrastructure sharing in the approach. The replicability of the Grameen model is further considered.

Harsha de Silva and **Ratna Kaji Tuladhar** in Chapter 7 use the case study of Nepal to identify necessary conditions for the successful use of smart subsidies to bridge access gaps in rural telecom service provision. Regulatory obstacles have long been a major barrier to progress in many areas of ICT infrastructure development. This research concludes that although smart subsidies can be used to provide rural communities with telecoms services the real question is whether such services are optimal and whether these projects can be sustained in the medium to long-term. Regulatory attention must give due attention to cost-based asymmetric interconnection agreements and effective mechanisms for addressing the incumbent's anti-competitive practices. The success of rural telecom service providers supported by smart subsidies is dubious unless the right regulatory conditions are in place. From a policy perspective, the findings of this case study indicate that it would be more useful to consider addressing rural connectivity issues from an integrated and continuous regulatory subsidy angle instead of separate solutions to address market gaps and access gaps individually.

Indeed, there is some evidence that the mood in governance is changing. Single formula solutions are no longer supportable and principles such as technology neutrality, open access to backbone infrastructure, and a public good rationale in certain ICT network components are becoming more prominent. A layered approach to network development, each with potentially a different set of regulatory and ownership possibilities, is emerging. Alongside private or public ownership, partnerships, local authorities, SMEs and indeed communities are seen as having a role to play.

Innovative combinations of locally owned enterprises, wireless and related technologies, and new or reconfigured financing mechanisms have potential to extend networks and services to marginalized communities in rural areas. In combination with a number of positive regulatory trends and ideas, these can make a significant difference to both network access and services among poorer rural communities. The potential for driving down costs and maximising use of community

resources, enables an emergence of a new business model that is both economically sustainable and empowering. Further, a high degree of community control can significantly enhance the viability and development impact of hybrid public, private and community networks and service solutions.

Chapter 8 is devoted to the case of microtelcos – small-scale telecom operators that combine local entrepreneurship, municipal efforts, and community action – and their role in extending ICT services in Latin America and the Caribbean, particularly in areas unattractive to large private operators. **Hernan Galperin** and **Bruce Girard** discuss a variety of microtelcos that are effectively providing service despite a less than favourable regulatory environment and little access to public subsidies.

Beyond efforts to make access affordable, it is also essential to allow for or to create conditions that stimulate propoor adoption of ICT and alternative uses of network infrastructure. An issue with relying on mobile telephony for network extension is that unless connected to network via expensive satellite services the signal does not reach far off of the beaten track of fixed line services. Especially for rural connectivity solutions, other wireless technologies could be useful to extend access points to other users and to remote communities. **Reza Tadayoni** and **Knud Erik Skouby** (Chapter 9) document the case of establishing a research and education network connecting different universities and research institutions within Ghana and also beyond via the Internet. A combination of HF, VHF and microwave solutions was used to achieve connectivity between university libraries dispersed over a wide geographical area and with different distances to the University of Ghana in Accra. The university network was subsequently connected to the Internet backbone via a VSAT connection grounded in Denmark.

New and emerging technologies, especially wireless, are particularly suited to the deployment of local network infrastructures because of their low level of initial investment, their scalability, their relatively simple technical deployment, their low-cost and open standards, and their adaptability to both voice and data requirements. This section illustrates the technological innovations that are increasing the potential of new ownership, management and financing models for extending participation in network development, opening up an ocean of opportunity.

An Investigation of the Replicability of a Microfinance Approach for Extending Telecom Access to Marginal Customers¹

Malathy Knight-John, Ayesha Zainudeen & Abu-Saeed Khan

1. Introduction

1.1 Research questions in context

As set out in the World Dialogue on Regulation for Network Economies (WDR) thematic statement for *Diversifying Participation in Network Development*,² institutional rigidities and policy and regulatory failures associated with traditional modes of network investment and expansion have resulted in the emergence of innovative solutions for network development. However, there is little comprehensive or systematic documentation of these new solutions, the factors that drive their success or conditions that allow for their broader replicability, to achieve universal access goals.

This research attempts to unbundle the particular set of solutions that has emerged for extending telecom access to marginal customers in Bangladesh under the Grameen Village Phone (VP) program, to examine the potential for broader replicability of a microfinance approach to the problem of access. The VP program, which has been widely hailed as a “unique case in the development of rural telecom infrastructure” (Bayes et al. 1999: 4), is the outcome of the Grameen Bank’s (GB) aim to (a) promote development and poverty alleviation through the use of information and communication technology (ICT); and (b) increase telecom access to the rural poor, whilst maintaining a sustainable business model.

As at June 2005, the VP program covered more than 64 million Bangladeshis or 45% of the country’s population,³ in approximately 50% of the villages in Bangladesh. This is particularly impressive in a country that had a total teledensity of six at the end of 2005 (Lane et al. 2006). The VP program supplies microfinance to entrepreneurial women in villages to

purchase a mobile phone, which is then operated as a pay-phone, providing shared access to fellow villagers for a fee.

Our analysis of the Grameen solution includes an examination of the specific incentives that led this entity to innovate in the manner that it did as well as the organisational aspects of extending telecom access to marginal customers – drawing from the literature on transaction costs coming out of New Institutionalism and attributed more specifically to Williamson (1985). An interesting insight coming out of this investigation of the VP program is that developmental and business goals need not be incompatible and that a carefully crafted and prudent mix of the two can result in a win-win situation for all parties concerned, enhancing the sustainability of the model. Citing from Keogh and Wood, “Village Phone is a methodology that creates a profitable partnership and a channel to market to bring telecommunications services to the rural areas of a developing nation” (2005: 2).

We further conclude that whilst the Grameen approach has undoubtedly been successful in terms of delivering results in a particular regulatory and market environment at a specific point in time, it is by no means a ‘cookie cutter’ template. Changes in telecom technology and markets can and have advanced different solutions to the access problem as will be expanded on later in this chapter. The key is to identify elements of the package that are contextually useful – as in the case of Uganda (see Annex 2) – and replicate those elements that will deliver the desired results, which in this instance is promoting greater participation in telecom/ICT networks.

The remainder of this section sketches a brief overview of the VP program. Section 2 considers the issue of access in terms of the marginal customer and unpacks the various elements of the Grameen approach to the problem. The concluding section

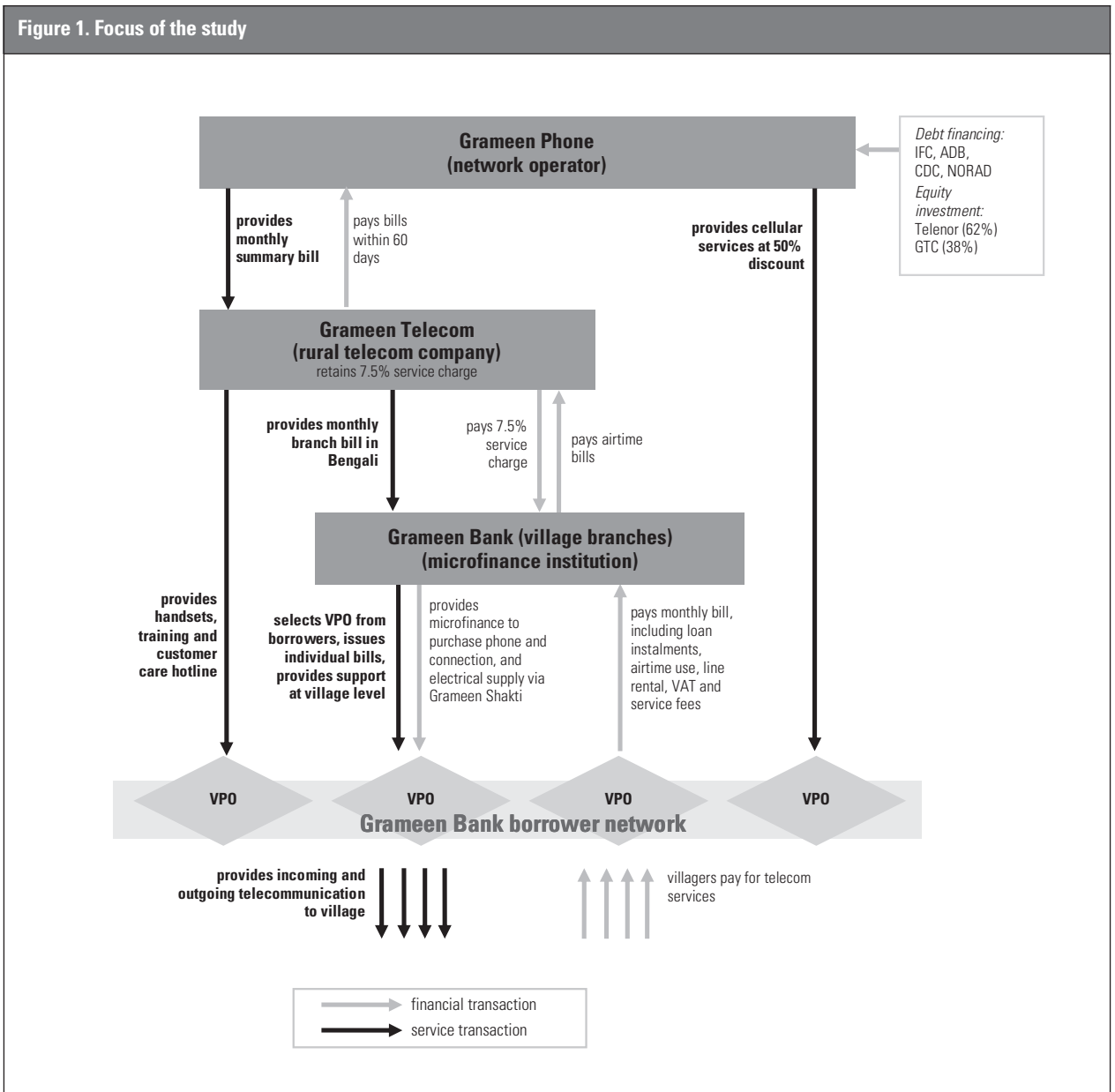
considers the feasibility of other solutions to the access problem – including variants of the Grameen approach – in the context of current and future changes in telecommunications markets and technology.

1.2 A brief introduction to the Village Phone Program

The VP program, an initiative of GB and Iqbal Quadir, a US-based Bangladeshi, was set up through the establishment of two companies – Grameen Telecom (GTC) and Grameen Phone (GP) – and has been in operation since 1997. Table 1 provides information on the two companies, including their

role in the VP program, while Figure 1 illustrates how the VP program works, setting out the relationships between the key actors.

Grameen Bank provides the equivalent of USD 133 in loans to each Village Phone Operator (VPO) – selected from GB’s borrower network – to obtain connections to GP’s cellular service and to resell telecommunications facilities to people in and around their villages. As shown in Figure 2, the VP program has expanded significantly since its inception, with more than 165,000 VPOs as at August 2005.⁴



2. The fundamental problem of access: The Grameen solution

2.1 Telecommunications access: Dispelling the myths

This section discusses common misperceptions with regard to under-provision of telecom services to marginal customers in countries with a low teledensity, and analyses the Grameen solution to the problem, identifying the incentives that drove the organisation to innovate in the access network as well as the factors that contributed to the success and sustainability of this particular approach.

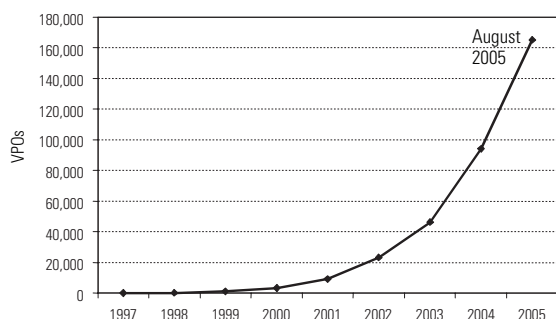
We define the 'marginal customer' as one who is excluded from market transactions under a given market setting (or a particular configuration of demand and supply conditions); by definition, if the supplier increases supply by a single unit, then

the marginal customer would be included in the market transaction. The question then is, what would it take for the supplier to increase supply by one more unit – or in this case, provide one more telephone connection? Why is it that an operator does not supply the 'next' customer? Why are telecom services under-provided? In Bangladesh, for instance, a country with a population of over 100 million, there were fewer than two telephone subscribers per one hundred inhabitants in 2003; and there is no shortage of countries whose teledensity is similarly low (ITU 2004).

One fundamental reason for under-provision of telecom services⁵ to potential customers in low teledensity countries is the misperception that it is not economical to do so. Operators commonly perceive that the costs associated with providing telecom access to marginal customers are too high, particularly given that marginal customers are often located in rural areas where the cost of installing infrastructure is usually higher than in urban locations. Further, operators often believe that transaction costs for providing services to marginal customers includes a significant payment collection component, which is perceived as too high to justify serving them. Second, demand for telecom services amongst marginal customers has traditionally been perceived as too low to make serving them a viable commercial operation. Operators believe that potential revenue from these customers would not be sufficient to cover the high costs associated with installing infrastructure and collecting payments. The common perception is that marginal customers are unable to afford the services that are provided, if they need them at all.

New research is shedding light on the accuracy of this received wisdom. There is a growing body of evidence that investing in marginal customers might be good for business after all. A recent survey⁶ of the use of telecom services by financially constrained communities in India and Sri Lanka found that 64% of respondents spent more than USD 4 per

Figure 2. Growth in Village Phone Operators (1997-2005)



Source: Grameen Telecom (2005b), <<http://www.grameenphone.com>>.

Table 1. Grameen Telecom and Grameen Phone

	Grameen Telecom (GTC)	Grameen Phone (GP)
Established	1995	1997
Type of company	not-for-profit private limited	for-profit shareholders: Telenor, Norway (62%) GTC (38%)
Objective	"to establish universal telephone access all over rural Bangladesh and to become a model for utilising telecom and information technology to empower the rural poor"*	"to receive an economic return on its investments and to contribute to the economic development of Bangladesh where telecommunications can play a critical role"***
Role in VP program	<ul style="list-style-type: none"> village phone network management, VPO monitoring system design for specific installations importation, distribution and aftercare of handsets provision of support and training of VPOs bulk airtime purchase provision of bill to GB branches (not individual bills) 	<ul style="list-style-type: none"> ownership, maintenance and expansion of communication infrastructure provision of technical support provision of airtime (at 50% discount) provision of summary bill to GTC securing government licence, compliance with regulations, liaison with government government financial and taxation liaison

* Grameen Telecom, <<http://www.grameentelecom.net>>.

** Grameen Phone, <<http://www.grameenphone.com>>.

month on mobile communications.⁷ Given that the sample was constituted of those with monthly incomes of less than USD 100, a conservative estimate of the percentage of monthly income spent on mobile communications⁸ would be 4%.

Bangladesh is a country that has, via the VP program, demonstrated that there is a large untapped demand for telecom services amongst marginal consumers (in the Bangladeshi case, the rural poor). Providing access to a telephone to communities in areas where hitherto there has been none, even if it means having to walk a mile or two to use it, provides people with opportunities to improve their lives in many ways. For instance, a factory worker located four to five hours away from her home can talk to her family in her village everyday, and work an extra few hours on the weekend, rather than spending almost ten hours travelling to see them for just a few hours and returning to the town for work the next morning exhausted. This is possible if both she and her family have access to a phone. The many uses of telephones and socio-economic benefits that accrue to VPOs have been well documented by Bayes et al. (1999) as well as by Richardson et al. (2000), including the ability to arrange financial transfers from relatives living in the city and abroad.⁹ Consumer surplus yielded by a phone call has also been estimated:

The consumer surplus for a single phone call from a village to Dhaka, a call that replaces a physical trip to the city, ranges from 2.64% to 9.8% of mean monthly household income. The cost of a trip to the city ranges from 2 to 8 times the cost of a single phone call, meaning real savings for poor rural people of between 132 to 492 taka (\$2.70 to \$10 USD) for individual calls" (Richardson et al. 2000: 2).

Quoting from Keogh and Wood (2005: 6), who cite a World Resources Institute study (Cohen 2001) and Lawson and Meyenn (2000), respectively:

Phones have helped elevate the status of the female phone operators in the village. Surveys have found that the Village Phone Operators become socially empowered as they earn an income, gaining participation in family decisions in which, in rural Bangladeshi society, women usually have no say.

...[Grameen Village Phone] has had considerable development benefits. It has reduced the cost of communications relative to other services such as transportation ... the program has enabled the village pay phone entrepreneurs, poor by most standards but among the better-off in their villages, to turn a profit.

Clearly there is a business case for the provision of telecom services to marginal consumers, with a potential win-win situation for all parties concerned.¹⁰ However, the way in which these services are packaged, marketed and delivered has to be appropriately designed for private operators to be able to profitably exploit the demand for telecommunications access – as demonstrated by the VP program.

2.2 Unbundling the Grameen solution

The fundamental questions explored here are: What were the initial conditions or triggers that drove GP to innovate in the access network? What design or organisational components ensured success? And, why has the Grameen approach not been replicated by other mobile operators in Bangladesh, given the apparent business case to invest in marginal customers?

2.2.1 Incentives to innovate

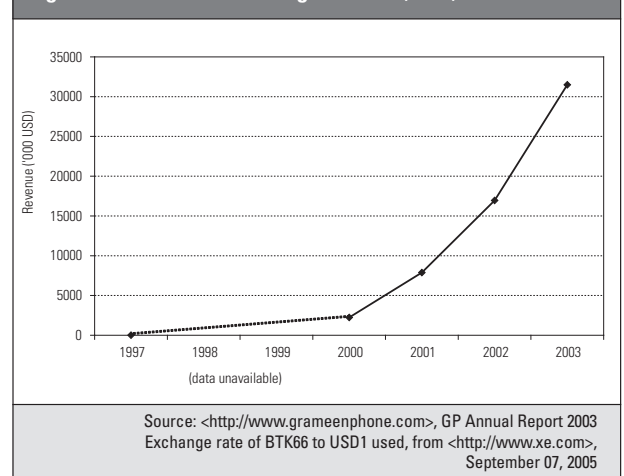
AN INFORMED PERCEPTION OF MARGINAL CUSTOMERS AS A POTENTIAL PROFIT BASE

As discussed above, a key factor impeding the supply of telecom services to marginal customers by the private sector is the widely held misperception that cost recovery is undermined by users' inability to pay. However, as set out at the beginning of this section, there is concrete empirical evidence to suggest that affordability is not a significant barrier to the access of telephony. What becomes apparent when reflecting on the move by Grameen to initiate the VP program is that GB's years of interaction with its clients¹¹ as a microfinance institution (MFI) with deep roots into rural communities contributed to a more informed perception of these clients as a valuable source of revenue and even profit base. The positive return on the decision to set up the VP program in terms of growth and revenue is illustrated in Figure 3.

EXTENSIVE NETWORK ACCESS

A significant part of the analysis of the incentives for Grameen's innovating in the way it did concerns the hostile conditions – in this instance, limited interconnection facilities – fostered by the incumbent fixed operator, Bangladesh Telegraph and Telephone Board (BTTB). These unfavourable conditions gave Grameen the push to seek other means of penetrating the countryside, resulting in GP entering into a network sharing

Figure 3. Revenue from Village Phones (USD)



agreement with Bangladesh Railway (BR), with the acquisition of a 1800 kilometre fibre optic network (FON). This arrangement gave GP access to a nationwide network corresponding in size to that of the incumbent.¹²

This resonates with Mueller’s thesis, based on US experience, that non-interconnection of competing networks creates three incentives to enlarge the scope of the network (Mueller 1997):

1. incentive to be the first mover to attract new user groups in unserved markets;
2. incentive to lower the price of access to entice new users, even if temporarily; and
3. incentive to interconnect users in non-competing networks and increase network footprint.

These incentives, driven by access competition, have promoted universal service in the US, and can also be applied to the case of GP’s network expansion strategy of leasing BR’s fibre optic network, GP being a non-interconnecting network facing competition from several other GSM and WLL operators. With the FON under its belt, GP was able to roll-out rapidly, gaining a critical mass of subscribers and creating a market for mobile-to-mobile only communication packages.

Other operators, constrained by insufficient interconnection with BTTB, have been unable to expand their networks

given the financial resources at their disposal. Most cellular operators have had to build their own microwave backbone (and in fact lease out spare capacity from GP), but coverage has been limited in comparison to GP, as reflected in the market shares shown in Table 2.

Furthermore, in the mobile business it is assumed there is a ‘tipping point’ of subscribers after which the profitability of an operator grows significantly. This hypothesis is underscored by the comparison of subscribers versus indicators of profitability for GP as well as for Dialog Telekom in Figures 4 and 5.¹⁴ In the case of Dialog Telekom, this point appears to be close to 500,000 subscribers, whereas for GP, the corresponding point appears to be around 750,000. What is apparent is that GP has surpassed this tipping point after which its profitability (indicated by earnings before interest, taxes, depreciation and amortisation – or EBIDTA) has soared. It is very likely that this may not have happened if not for the first-mover advantage that GP gained with its access to an extensive, nationwide FON.

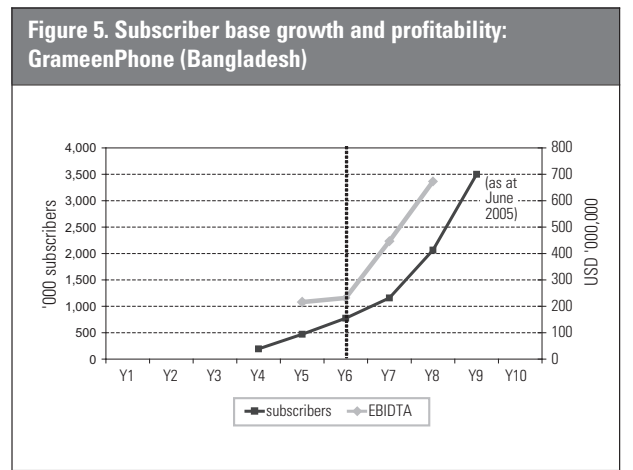
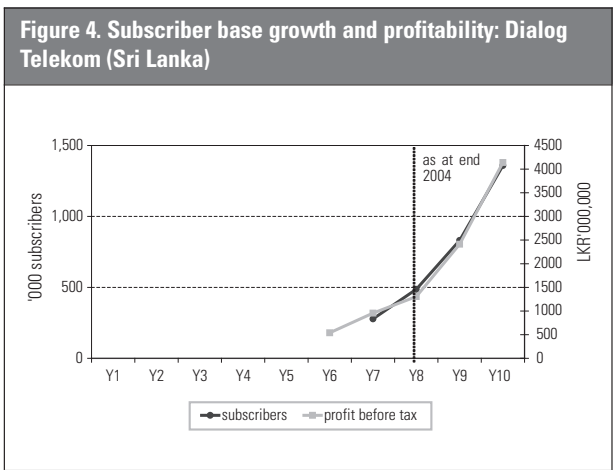
GP’s coverage (as at June 2005) is depicted in Figure 6, with Bangladesh’s railway network mapped on the same diagram. Access to BR’s FON has facilitated extensive, and importantly, rapid growth of GP’s coverage. (The rapid expansion of GP’s network coverage is shown in the series of coverage maps in Annex 1). Although GP’s network has not been extended specifically to reach rural subscribers, service is extended from the FON along the railway to selected villages through microwave links.¹⁵

GP has thus maintained significant advantage in comparison to other operators, allowing it to penetrate throughout the country at prolific rates, as indicated in Table 2 as well as Figure 5. The profits it has consequently been able to generate are perhaps what allow GP to provide airtime discounts. According to Telenor (GP’s 62% shareholder), the number of subscriptions in GP increased by 776,000 in the second quarter of 2005 and this contributed to GP’s revenue growing by 53% compared with the second quarter of 2004 (Telenor 2005a).

Table 2. The mobile sector in Bangladesh, August 2005¹³

Operator	No. of lines
GrameenPhone	> 5 million
Aktel	2.2 million
Banglalink (Previously Sheba Telecom)	0.4 million
Citycell (Pacific Bangladesh Telecom Limited)	0.3 million
Teletalk	0.18 million

Source: <http://www.financialexpressbd.com>.



However, with the large amounts of investment deriving from global telecom companies since late 2004 (for example Orascom and SingTel into Sheba Telecom and Pacific Bangladesh Telecom) and new interconnection deals being signed with BTTB, the sector is set to grow immensely with the likelihood of greater competition in and for the market hitherto dominated by GP. Moreover, there is a strong possibility that these other operators with new interconnection facilities and increased financial resources at their disposal may very well target unserved markets, given the business case for investing in marginal customers as demonstrated by Grameen.¹⁶

2.2.2 Design and organisational factors contributing to Grameen's success

GRAMEEN: THE BRAND AND THE NETWORK

Grameen's initial advantage over competitors – both private telecom operators as well as other MFIs – via adopting a network sharing solution answers one piece of the puzzle regarding the lack of replication of this business model in Bangladesh. Our in-country interviews also drew attention to other critical factors relating to the wider Grameen family such as the Grameen brand image and the ability to piggy-back on GB's established microfinance infrastructure and networks –

particularly in the context of determining and ensuring the creditworthiness of clients.

The inheritance of the Grameen brand image appears to have had a significant impact on the sustainability of the VP program, ensuring the buy-in of the VPOs, whilst reducing the chances of competitors making inroads into its territory.

The following citation, taken from the *Telenor Annual Report 2004* is an illustration of this point.

[...] Additionally, Grameen Phone is the only operator in Bangladesh to offer nationwide coverage. We believe that the "Grameen Phone" brand has been established as a best quality brand (Telenor 2005b: 37).

Important to note in this context, and also a useful point for issues of replicability, is that brand image and credibility play a pivotal role in leveraging support particularly in countries with a reputation of bad governance with weak legal systems¹⁷ and no or inadequately defined property rights.

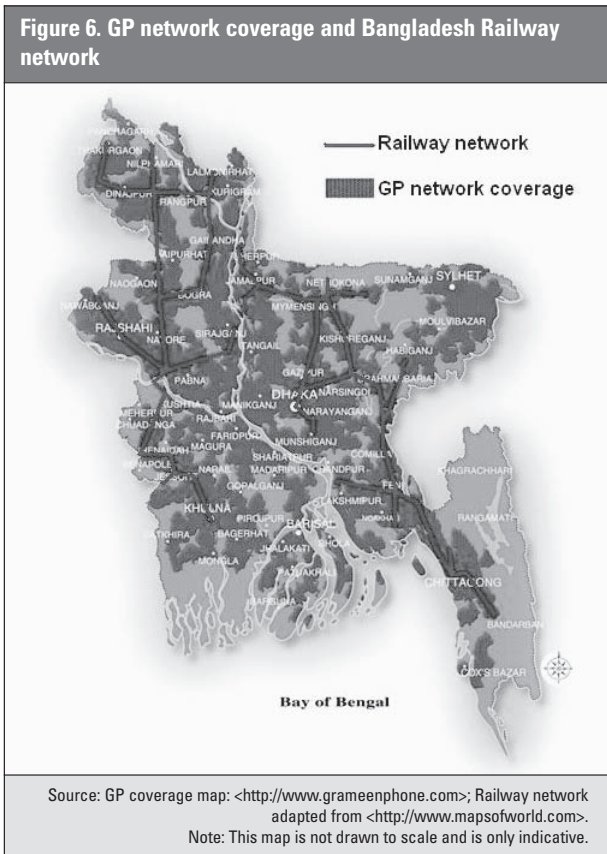
Scale and scope economies stemming from the Grameen family infrastructure and network (further discussed below) have played an extremely significant role in the success of Grameen's approach, whilst again making it harder for competitors that do not have such opportunities for piggy-backing to enter the arena.

An important point relating to the discussion of why other players in Bangladesh have not replicated the Grameen approach is the particular manner in which GB ensures high repayment levels. The literature on compliance points to various interpretations of this phenomenon, ranging from Fukuyama's (2001a; 2001b) moralistic explanation based on concepts of social capital and trust to Harris' (2003) more comprehensive and inclusive explanation combining elements of power and hierarchy:

[...] 'character assessment' (A trusts B because of who he or she is) and 'incentive assessment' (A trusts B because of her assessment of the incentives acting upon the other) [...] character assessment (may rely) on characteristics shared by A and B (for example, they are of the same ethnicity). Incentive assessment may take account of institutionalised sanctions acting upon B; of the reputational jeopardy to which she may be subject in the event of her failing to behave appropriately; of the possibilities of direct retaliation against her (Harris 2003: 5).

Social capital, trust and power are all elements of relationships and as for any phenomenon dealing with human behaviour, they cannot be boxed into neat categories – there are bound to be overlaps and mixes of the different elements in any organisational structure that involves human interaction. However, in the specific instance of GB it appears that power – what Harris (2003) terms 'incentive assessment' – is of greater significance in explaining the high rates of debt repayment.

The power relationship between GB and its borrowers is illustrated by the *sixteen decisions* set out by GB that borrowers must commit to when becoming a member of the Bank – for example, the borrower will outlaw dowry practices; the bor-



rower will use pit latrines; the borrower will drink only from tube wells where available and if not will boil their water or use alum; the borrower will educate their children, etc. These decisions are implemented to fulfil a social development agenda whilst addressing basic needs of the clientele.¹⁸ Moreover, GB staff are embedded in the village community and regularly interact with borrowers through weekly meetings. As such, if a borrower defaults on loans, she not only runs the risk of jeopardising her own reputation within the community, but also may lose her chance of obtaining loans in the future. There is therefore a great incentive for the borrower to pay back loans.

STRUCTURING OF COSTS

From the perspective of GP, the company that owns and operates the cellular network, the VP program is *one* customer. GP treats the entire program as a bulk buyer of airtime, issuing a single summary bill at the end of the month to GTC for the aggregated airtime of all the VPOs. GTC then makes out airtime bills in Bengali for each GB branch office, with a summary for that branch. The GB branch makes out individual bills for each VPO, and the actual collection of monies from VPOs is carried out by the GB branch at the village level; monthly bill collection is tied together with that of loan repayments (including that for the initial package). The branch pays the bill to GTC within the last date of payment. GTC bears marketing and advertising costs of the VP program, supplies handsets, provides support, training, service and repair of handsets, and overall management of the VPO network.¹⁹ GP therefore avoids several costs, as compared to the case of a virtual network operator (VNO), than if it were to provide individual connections to VPOs without the involvement of GTC and GB. GP only incurs costs related to:

- communication infrastructure;
- technical support;
- provision of airtime (which is provided at a 50% discount);
- provision of summary bill to GTC;
- government licensing and regulation compliance and liaison; and
- government financial and taxation liaison.

The result is a situation for which in 2004, the 3.85% of GP's subscribers that constituted the total number of VPOs accounted for 15.5% of all GP airtime revenue (Alauddin 2005), while incurring less costs than associated with a regular subscriber. As at June 2005, the average revenue per user generated by VPO connections was twice that of GP's regular subscribers. Although each of these connections may serve an entire village and thus cannot be compared with a regular single-user subscriber, the point to note here is that from the perspective of GP, if *twice* the amount of revenue is generated from a smaller base of costs, this is surely enough to convince another operator to do the same.

REDUCING THE RISK OF SERVICE PROVISION: SCREENING CREDITWORTHY CUSTOMERS AND ENSURING REPAYMENT

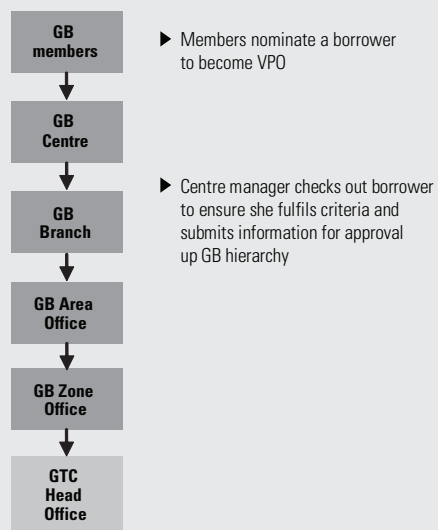
The VPOs are selected from the larger pool of GB borrowers. These borrowers must have been members of the Bank for a certain period of time, and must have a good repayment record in order to be eligible to become a VPO (see Box 1). The selection process is run by GB at the village level, and ensures that reliable borrowers are selected to operate the village phone.

Box 1. The selection of a VPO from Grameen Bank's borrower pool

The selection process

Although the members decide amongst themselves who gets the phone and becomes the VPO, the borrower must, also:

- have been a member of the Bank for a minimum period;
- have a good track record of repayment;
- have a good business in operation, and have time to operate the VP;
- have at least one literate member in her household, if she isn't;
- have access to electricity; and
- live in a central location within the village.



GTC only comes into the picture for the final approval and subsequent issue of the phone to the selected VPO. The detailed information required for selection (e.g. whether the borrower's husband is a criminal) would be near impossible to ascertain at the GP or GTC level.²⁰ As such, through its relationship with GB, GP is able to tap into a reliable pool of borrowers, and moreover, the selection process ensures that only borrowers with good repayment records become VPOs.

Overall, Grameen's level of repayment is 98.95%.²¹ High levels of non-payment of bills can make operators reluctant to provide services to rural areas. Administration of the entire VP program is carried out by GB at the village level, with its network and infrastructure covering close to two-thirds of the villages in Bangladesh. GB is the first point of contact for VPOs, with GB staff permanently located in the village and regularly meeting with borrowers; GTC staff visit the GB centres in the villages less regularly. This model, with its regular meetings with VPOs, works well to avoid problems of moral hazard (unwillingness to pay back) and adverse selection (carrying a larger percentage of bad payers) associated with informational asymmetries between lenders and borrowers.

An additional factor that enhances the prospects of repayment and sustainability is the different approach to microfinance that characterises the VP program. In contrast to the conventional approach and analogous to the ancient Chinese proverb of giving a poor man a fishing rod versus a fish, the VPO is provided with a livelihood – a means of generating a steady income by reselling telecom services – rather than just a meal.²²

Quoting Muhammad Yunus, Nobel prize winning founder of GB:

The quickest way to get out of poverty right now is to have one mobile telephone, and you will see how quickly she is changing her life. Come back in two years and you will not recognize what she was before.²³

By giving a poor villager micro-credit to buy a phone under the VP program, the income that is generated by the villager as VPO puts her in a better position to make loan payments as well as pay monthly usage bills (as opposed to providing micro-credit to a villager to buy a phone for her personal use). The greater certainty of payment that results from the design of this program is an encouraging factor for operators to provide rural telecom services.

INCREASING AFFORDABILITY OF MOBILE COMMUNICATION

There are several factors that have increased the affordability of mobile telecom for rural Bangladeshis.

Aggregated demand: The basic concept of a village phone, with one phone providing access to multiple users, sometimes even an entire village, means that the usage per connection provided by GP is higher than for normal GP customers, as evidenced by the revenue generated by each VP compared to that of a regular subscriber. Villagers do not have to invest in a phone to use phone services. From the perspective of the VPO

who invests in the phone, the cost can be offset by the revenue that the VPO generates from selling telecom services to her clientele, over a period of about two years.

Discounted airtime: GP provides airtime for VPO customers at a discounted rate of approximately 50%. This was initially part of GP's business strategy (embodied in the principle of 'good development is good business'), as the VP program started the day that commercial services of GP were launched in 1997. However, it is now one of GP's biggest Corporate Social Responsibility programs. The discount is an exclusive privilege offered by GP to GTC, and applies to all rates that are normally charged to GP customers. The tariffs charged to the VPO are hence less than what regular GP customers pay. Generally tariff reductions (regular customer tariffs) are passed on to GTC. The discounted rate allows GTC to cover its costs, and the VPOs to make a profit. The VPO charges a rate higher than the cost that she incurs²⁴ and the difference is her profit. According to Alauddin, "VP operators charge around BDT 4-6 to the customer, depending on the availability of phones in the locality"²⁵ (2005: 3-4).

Undoubtedly, this airtime discount has contributed to the success of the VP program. If this discount were removed, for instance, the rates that VPOs would have to charge users to cover the cost of airtime would be much higher; in turn, demand for telecom services would be much lower. Hence profitability of each VP would be less, and the sustainability of the program would be negatively affected.

Micro-loans to start a VP business: The selected VPOs are provided a loan package from GB to purchase a handset and start their VP business. This basic package consists of an activated Grameen Phone SIM card, one handset,²⁶ a battery, a fast charger, a user guide in Bengali and a price list for different destinations (national and international calls). The cost of the handset is also subsidised by GTC. As mentioned above, the total package typically costs USD 133.²⁷ The VPO pays back this loan in instalments usually over a period of two years;²⁸ the loan repayments are added to a monthly bill, which includes airtime charges, line rental, etc., issued to the VPO by her GB centre.

Grameen also provides loans to selected VPOs to purchase solar panel cells and DC batteries if the VPO does not have access to electricity to charge the handset battery. In areas where there is network coverage but no electricity, GB approaches Grameen Shakti, one of the 26 Grameen sister entities, which markets solar panel cells and DC batteries. GB gives the VPO a loan to purchase the solar panel cells or DC battery from Grameen Shakti, which is repayable to GB through monthly instalments. The total cost of the solar panel cells and DC batteries are approximately USD 111-127 (BDT 7000-8000) and USD 190 (BDT 1200), respectively. This means that the VP program is feasible even in areas where there is no available electricity. The fact that VPOs can obtain the loan as well as the device all from one organisation also lowers their overall transaction costs.

3. Replication of a microfinance approach to telecom access: The future

The analysis in this section has focused on unpacking the set of ingredients that have contributed to the success of the Grameen approach to the problem of extending telecom access to marginal users. It is important to reiterate that the Grameen solution was formulated to handle the access problem under particular market, regulatory and technological conditions. In other words, the Grameen approach is by no means a universal remedy with guaranteed success under changing market and technological conditions or implementation in countries with different regulatory policies. As such, the value of unbundling the Grameen experience is to distil replicable factors, if any, as well as the conditions necessary for replication.

3.1 Access to infrastructure

A key factor for replication is access to network infrastructure. In the Grameen case, the network sharing agreement with BR was fundamental to GP's first-mover advantage in unserved and under-served markets. As noted above, the signing of new interconnection deals between BTTB and other mobile operators combined with the flow of large amounts of investment into Bangladesh's mobile sector may well increase competition in the market, leading to a gradual decline in GP's dominance. An additional point to be emphasised here is that although the original Grameen model focused on telecom access alone, there is a business case for exploring the potential to extend the approach to ICTs in general.

3.1.1 Tailoring the model to tackle transaction costs

Another factor to be taken into consideration in the discussion on replicability is the importance of a design/organisational structure that is capable of overcoming higher transaction costs generally associated with serving marginal customers. The key issue, thus, is to identify and develop a cost-effective business model ensuring access to telecom for marginal consumers, whilst also ensuring sustainability. Drawing from Williamson (1986), the organisational structure that evolves is determined largely by the transaction costs involved in providing the service. In the Bangladeshi case, the high transaction costs associated with the provision of rural telecom services, lowered by the extensive infrastructure that Grameen has on the ground, led to an internalised model, for which all parts of the process remain within the Grameen framework or family. The Ugandan example (see Annex 2) testifies to the fact, however, that success is possible even with multiple, unrelated partners, as long as the model is designed to ensure a win-win outcome for all. Moreover, as set out in the discussion on a reseller solution to the access problem, below, an operator with a slightly lower or different set of transaction costs might well opt to outsource the operation of the VP program to another (unrelated) commercial entity, provided that this approach ensures profitable results.

3.2 The prepaid option

The prepaid approach, adopted in the Ugandan case, provides a workable alternative to the Grameen approach to the problem of ensuring repayment. In the prepaid model, users (who have already obtained a handset and connection to a network operator) purchase airtime (or credit) in advance, either in the form of a standard value (e.g. 500 rupees), or in some countries through an automated system in which users can credit their account at retail outlets, such as grocery stores, book shops, etc. As they make use of the services of the network operator that they are connected to, their available credit balance is depleted; once a user's credit runs out, she cannot access services until the balance is topped up by obtaining more credit.

The users of this service have largely been in developing countries,²⁹ where fixed telephony is either unavailable or very limited or in instances where mobile service exists but users at the margin are unable to obtain post-paid connections (or monthly subscriptions, for which the user pays a bill at the end of the month for her usage) due to not having a permanent billing address or not being able to furnish the required deposit, etc. In general, these requirements are aimed at establishing that the potential customer is creditworthy. In developing countries, credit histories are not well documented and it is difficult to distinguish between customers who are likely to pay their monthly bill and those who are not. Further, authentication mechanisms such as social security numbers are not available to assist in identifying customers who default. Thus, a lack of information on these customers drives up risk and therefore the transaction costs of doing business (that is, through monthly subscriptions) with these customers. The prepaid approach therefore offers a solution in which customers pay up-front for their usage, thus eliminating risk of default. According to one Sri Lankan wireless local loop operator,³⁰ the company's non-payment rate was more than halved (from 14% to 5% over a period of a few years), through relationship building with its defaulting customers, personally discussing with them their particular problems with payments and designing payment plans to suit such needs. This can however be a costly exercise.

Although there are several costs that an operator can avoid and/or reduce through a prepaid approach, there are still significant costs involved in a prepaid system. Prepaid operations require highly sophisticated software systems tracking account balances and deducting the correct amount of credit for each and every call, SMS and whatever other services that are used. Costs are also incurred in printing and distributing charge cards (or top-up cards) to retailers. If an automated crediting system is in place (as described above) then this also requires sophisticated software as well as a small piece of equipment for the retailer to credit customers' prepaid accounts from.

3.3 The reseller approach

A solution that has evolved from entrepreneurial roots is the reseller model. The basic model involves a network operator that owns and maintains the network infrastructure and pro-

vides the service (i.e. airtime) to a buyer, who then resells this airtime, usually for a profit. There are two versions of this model, each defined by the nature of the relationship between the reseller and the network operator. The first is that of the local reseller. An entrepreneur obtains a telephone line(s) from a network operator, paying a connection fee and monthly bill which includes line rental and airtime charges. The local reseller provides telecom services to people in the vicinity commercially, most likely making a profit. In this case, the reseller is almost like a regular customer. These resellers may or may not be required to obtain a licence, or register with the regulator. In Sri Lanka, regulation of these local resellers (known as communication bureaus) is minimal. In fact, the network operator is required to obtain approval of the regulator for any resellers of its services.³¹ The resellers are only required to display their registration document, display their tariffs for customers to clearly see and provide a receipt for services.

In theory, the risk from the network operator's perspective should be greatly reduced, as the local reseller collects usage charges from the end-users, whom the network operators perceive to be risky. However, this solution has problems in practice. According to one wireless local loop provider in Sri Lanka, these customers (i.e. the local resellers) are in fact riskier than regular (individual) subscribers, running up bills of thousands of dollars, leading to line disconnection upon non-payment. There is nothing to stop these resellers, for instance, from obtaining a new line at a slightly different address (for example, street number 59/1 as opposed to the earlier 59), under a different household member's name, and starting a fresh business.³² In countries where legal systems do not function properly, it is sometimes more costly to take legal action than to simply write off bad debts. Thus the problem of risk cannot be fully dealt with through this approach.

The second kind of reseller, virtual network operator companies, lease network capacity from operators and resell services to subscribers under their own brand name, utilising their own assets such as content and distribution.³³ Here the relationship between the VNO and the network operator is one in which the former purchases bulk airtime from the latter, paying by the minute. The network operator may or may not provide airtime at rates below regular subscriber rates, although it seems logical, as costs such as billing, collection, distribution, etc., are avoided by the network operator. The network operator thus incurs lower operation/variable costs and can afford to sell airtime to the reseller at a discounted or bulk rate. For the VNO approach, the risk of providing service to the customer at the margin is transferred from the network operator to the reseller (assuming the reseller does not default on payment to the network operator).

3.4 Conclusions: Replication in the current context

A key question that arises is what would prevent private individuals from purchasing a wireless handset and connection and operating a pay-phone service in their village (given that service is available in that particular village)? Perhaps back in 1997 when the VP program was launched this was not feasible, given handset costs, mobile tariffs, pricing plans, etc. However, today the costs of handsets as well as tariffs have come down significantly, thus bringing down the cost of starting a VP business.

Table 3 identifies potential barriers that a private individual may have faced in 1997 when attempting to launch a mobile payphone business, vis-à-vis Grameen's answer to these problems, and looks at the relevance of these measures in today's context.

Potential barriers in 1997	Solution adopted in 1997	Is this still applicable?
High cost of handset	Obtain micro-credit from GB and purchase handset (as part of a larger package including connection)	Handset prices have fallen dramatically. ³⁴ The Ultra-low-cost Handset Initiative of the GSM Association intends to bring the cost of a basic handset below USD 30, aimed specifically at emerging markets. ³⁵ Where micro-credit is still required, it is not absolute that it be obtained from GB in the Bangladeshi case.
No electrical supply available to recharge handset / cost of power supply (DC battery for example) is too high	Obtain micro-credit from GB to purchase power supply	If the cost of obtaining a power supply is too high, there may still be a role for microfinance. However, there is nothing to prevent a person from obtaining micro-credit from a microfinance institution other than Grameen.
Cannot obtain a connection because operator cannot ascertain customer's credit worthiness	Established credit-history with GB signals credit worthiness	Individual can obtain a prepaid connection, overcoming credit worthiness problems.
High cost of bill collection for operator	Use of GB village-level infrastructure to collect monthly bills	Prepaid connections can also circumvent this problem. However, if a post-paid approach is taken and a bill-collection agent is required, it is not absolute that this entity be a microfinance institution. The network operator can outsource this function to another company, for example.
Airtime charges are too high for individual to maintain a profitable business (end-users cannot afford rates that the reseller would like to charge)	50% airtime discount provided by GP	Given that the network operator avoids several costs and faces lower transaction costs, a discount may still be required so that costs can be recovered down the line, where non-core functions (i.e., those other than which GP currently provides) are carried out, as in the case of the VNO.

What becomes evident from this analysis is that microfinance is not a *necessary* element for the success of a village phone-type program. Furthermore, while it is perfectly conceivable that an operator may outsource various elements (e.g. distribution, billing, etc.) of the system to other organisations, it is not necessary that all aspects of the operation be outsourced to the same entities. However, obviously the fewer organisations involved, the lower the transaction costs and thus the lower the cost of using the telecom services to the end-users. In the final instance, if any initiative to extend access to marginal customers and increase participation in networks is to be sustainable and replicable, it has to rely on a fundamentally sound business case.

Notes

¹ This research was supported by the International Development Research Centre of Canada (IDRC). The helpful comments of Harsha de Silva, Divakar Goswami, and Rohan Samarajiva of LIRNEasia, William Melody of LIRNE.NET, Chanuka Wategama of UNDP APDIP (Colombo) and Mahinda Ramasundara of Suntel (Pvt.) Ltd., as well as the participation of the interviewees, are gratefully acknowledged. The views expressed in this paper do not reflect those of the Institute of Policy Studies.

² See: <<http://www.regulateonline.org>>.

³ Data provided by GTC on field visit, 21 June 2005. Bangladesh population data from World Bank data, *Bangladesh at a Glance* at: <http://www.worldbank.org/cgi-bin/sendoff.cgi?page=%2Fdata%2Fcountrydata%2Faag%2Fbgd_aag.pdf>

⁴ Grameen Phone, <<http://www.grameenphone.com>>.

⁵ Not discounting any regulatory or policy barriers that operators may face in attempting to expand their networks; however, these barriers will not be discussed in this paper. For a discussion of regulatory and policy prerequisites for extending access to ICTs, see Samarajiva (2005).

⁶ Research undertaken by LIRNEasia.

⁷ Of this group, almost half spent more than USD 8 per month on mobile telecommunications, or 8% of their monthly household income.

⁸ Assuming that the respondent receives the maximum possible household income of USD 100.

⁹ Bangladesh is a country with a high migrant population, with many Bangladeshis travelling to urban centres as well as overseas for employment.

¹⁰ Whilst this chapter deals with issues of demand for telecom services, it does not look at other key factors such as the threshold of volume required for replicability; it is very likely that countries with smaller populations and/or less densely populated rural areas may not be ideal candidates for the Grameen-type solution.

¹¹ These would most likely also be considered marginal customers for telecom and perhaps other services as well.

¹² GP acquired exclusive access to BR's FON through a competitive bidding process; private operators participated in this bid. As Grameen offered the highest price, it succeeded in clinching the deal.

¹³ In December 2005, the Bangladesh Telecommunications Regulatory Commission (BTRC) awarded the country's sixth mobile phone licence to

the United Arab Emirates-based Warid Telecom International (from <<http://www.newkerala.com/news.php?action=fullnews&id=62321>>).

¹⁴ Sri Lanka's largest GSM operator, with a market share of more than 50% at the end of 2004 (Asia Securities 2005).

¹⁵ Although in areas without fibre optic infrastructure GP has constructed and operates by microwave links, like in the south of the country, for example (Cohen 2001).

¹⁶ These developments could however be stymied by the recent imposition of a BDT 900, or approximately USD 14 tax on new SIM cards – which is roughly equivalent to 40% of the average monthly income (USD 33.33) of a Bangladeshi (World Bank 2004).

¹⁷ According to World Bank (2005a) measures of the ease or difficulty in enforcing contracts, it takes 29 steps and 365 days to enforce contracts in Bangladesh; this compares to OECD averages of 19 steps and 232 days to enforce a contract. The cost of enforcing contracts is 21.3% of debt in Bangladesh, while the average for OECD countries is 10.9%.

¹⁸ See: <<http://www.grameen-info.org/bank/the16.html>>.

¹⁹ Grameen Telecom (2005b) presentation slides provided by GTC.

²⁰ The lowest level of GTC's administrative structure is the 'unit office', of which GTC has 14, while GB has over 1,500 branch offices spread across the country.

²¹ See: <<http://www.grameen-info.org/>>.

²² The average net income earned by a VPO operating a village phone was approximately the equivalent of USD 68 per month in 2004 (Alauddin, 2005: 4), which is more than double the per capita income for Bangladesh.

²³ Muhammad Yunus, at *A Dialogue on ICTs and Poverty: The Harvard Forum*, International Development Research Centre (IDRC), September 2003, Cambridge Massachusetts; taken from Spence (2005).

²⁴ Which includes airtime charges, value added taxes and service charges.

²⁵ Call charges as at June 2005: mobile-mobile: BDT 2.24 per minute (peak) and BDT 1.12 per minute (off-peak).

²⁶ Models: NOKIA 1100 & 1108; GTC is a NOKIA agent in Bangladesh.

²⁷ See Grameen Telecom (2005a).

²⁸ Although the VPOs may pay the loan back in larger amounts over a shorter period if they wish to, they usually do not.

²⁹ For example, in the aforementioned study being carried out by LIRNEasia, of a sample of 3199 respondents with monthly household incomes below USD 100 in 11 locations spread across India and Sri Lanka, 83% of mobile users were prepaid customers.

³⁰ Commenting on the interim draft of this paper, 26 August 2005, Colombo.

³¹ *Act No 25 of 1991, as amended by the Sri Lanka Telecommunications (Amendment) Act No 27 of 1996*, Section 18 a. At <http://www.trc.gov.lk/act_part_ii.htm>.

³² Commenting on the interim draft of this paper, 26 August 2005, Colombo.

³³ Adapted from the definition of 'mobile virtual network operators' or MVNOs given by Sekino et al. (2005: 3).

³⁴ This can be illustrated by the fall in the amount of the initial loan package for VP business start-up from USD 312.50 in 2000 to USD 133 in 2005.

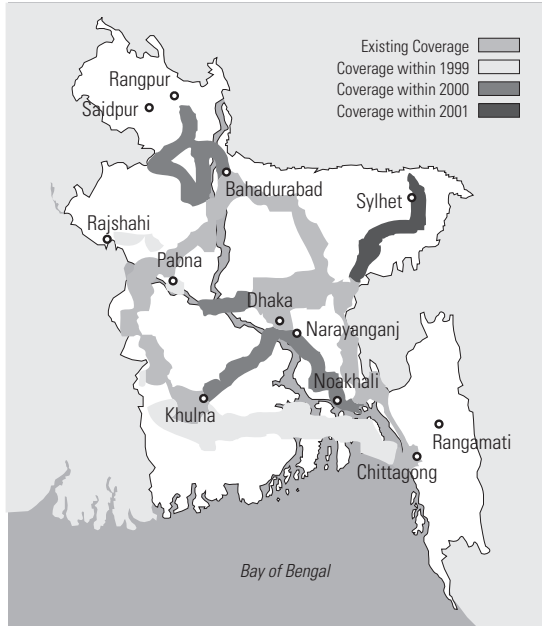
³⁵ See <http://www.gsmworld/emh/news/emh_press_gsma150205.html>.

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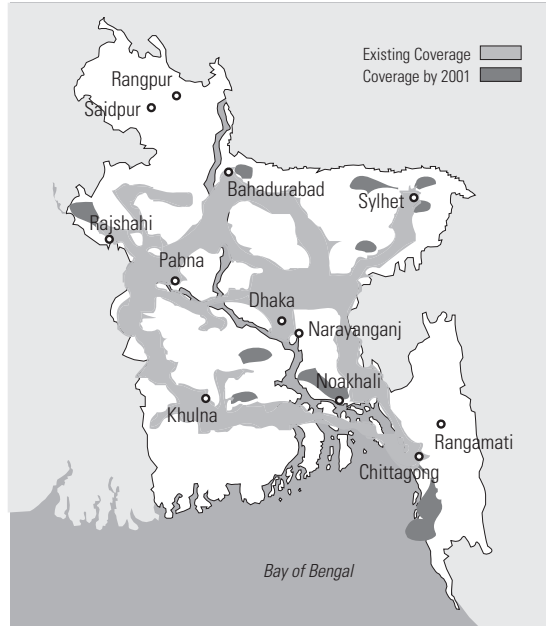
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Annex 1. Expansion of network coverage of Grameen Phone Limited (1998-2004)

1998¹



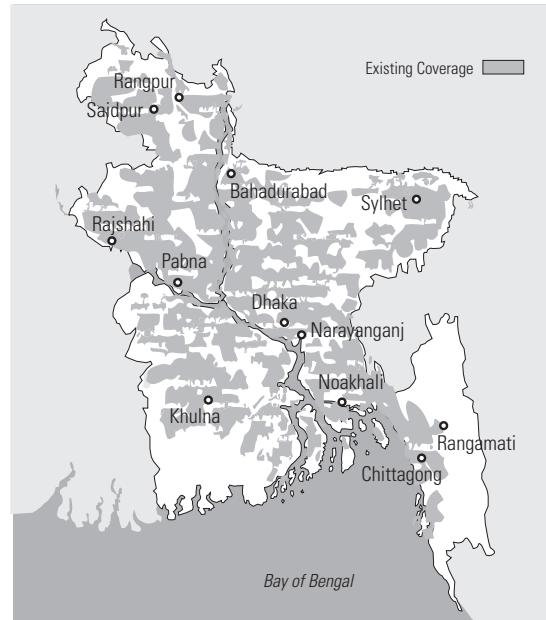
2001²



2004 December³



2005 August⁴



¹ Grameen Phone, taken from Richardson et al. (2000) Grameen Telecom's Village Phone Program in Rural Bangladesh: a Multi-Media Case Study, Telecommons Development Group.

² Grameen Phone, taken from Chowdhury (2002) Attaining Universal Access: Public Private Partnership and Business NGO Partnership, discussion paper, ZEF Bonn.

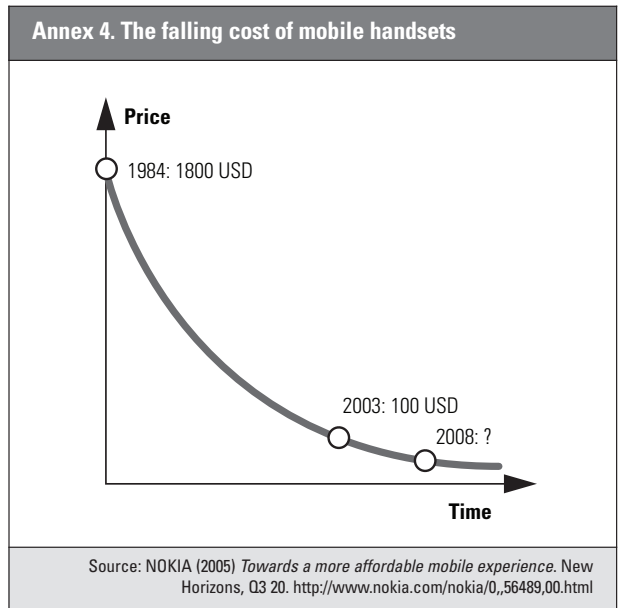
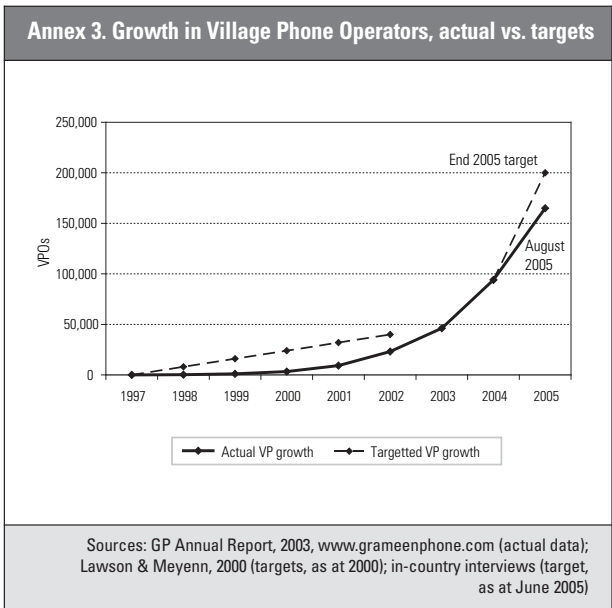
³ <<http://www.grameenphone.com>>

⁴ <<http://www.grameenphone.com>>

Note: Approximate coverage plan not on scale and is subject to change without notice.

Annex 2. Comparison of Grameen VP program to Uganda and Rwanda replications			
	Grameen Village Phone (Bangladesh)	MTN Village Phone (Uganda)	Rwanda Pilot project (Rwanda)
Established	1997	17 Nov. 2003 (officially launched operation commenced March 2003)	2004
Number of VPOs	139,977 (June 2005)	2,000 (Aug. 2005)	
Implementing organisation	Grameen Telecom (GTC), established by Grameen Bank in 1997 for VP program	MTN Village Phone, established in 2004 for village phone program shareholders: Grameen Foundation USA, MTN Uganda	
Grameen involvement	Grameen Bank, Bangladesh	Grameen Technology Center, Grameen Foundation, USA	
Network operator	GrameenPhone Founded in 1997, for the purpose of serving the VPs as well as providing commercial services. Largest cellular network operator GTC is a 38% shareholder	MTN Uganda Launched commercial services in 1998. The dominant telecommunications company in Uganda	MTN RwandaCell Founded in 1998. In six years MTN RwandaCell has become the leading telecommunications company in the nation.
Subscribers	3.5 million subscribers, June 2005	Over 700,000 subscribers More than 90% of the urban population. Border-to-border coverage.	75% of the population
Coverage	61 out of 64 districts	52 district capitals and over 150 towns	
Discounted airtime	Yes 50% discount	Yes	
Post-paid/prepaid	Post-paid	Prepaid	
Loans provided to purchase phones	Yes; USD 133	Yes; USD 230	
Loan payback period	22-36 months	Up to 12 months	
Package	<ul style="list-style-type: none"> • activated GrameenPhone SIM card • handset with battery • fast charger • user guide in Bengali • price list for different destinations 	<ul style="list-style-type: none"> • mobile phone • SIM card • booster antenna • solar panel/battery • cables • airtime cards • signage & business cards • manuals & training 	
Microfinance institutions	Grameen Bank Clients: over 4.76 million Operational since 1976.	<p>UWFT <i>Uganda Women's Finance Trust Limited (UWFT)</i> Operational since 1987; network of nine urban and rural-based branches.</p> <p><i>Foundation for International Community Assistance (FINCA) Uganda</i> Established in 1992. Estimated 36,000 low income borrowers (2003), 1457 Village Banking groups across Uganda.</p> <p><i>Foundation for Credit and Community Assistance (FOCCAS) Uganda</i> Began operation in 1996. Over 16,000 women clients in six districts of Eastern Uganda.</p> <p><i>Uganda Microfinance Union (UMU)</i> One of the leading microfinance institutions in Uganda and in all of Africa. 60,000 members from its 18-branch network.</p> <p><i>Feed the Children Uganda</i> Commenced operation in 1991, as a relief organisation. Involved in initiatives covering 12 districts across the country. Over 402 groups of women borrowers spread across 11 districts.</p> <p><i>MEDNET (World Vision)</i> (Joined July 2004) Over 13,000 borrowers.</p> <p><i>HOFOKAM (Catholic Dioceses of Fort Portal, Hoima and Kasese)</i> (Joined Nov '04) Established in 2003. Now the largest rural MFI in Uganda Over 15,000 clients and a loan portfolio in excess of US\$ 450,000.</p>	<p><i>Urwego (World Relief)</i> Clients: more than 18,000 families in ten of Rwanda's 12 prefectures One of the predominant MFIs in the region of East Africa. A World Relief initiative. Established in 1997. The institution has grown almost 150% in the last year and recently reached a level of self-sustainability.</p> <p><i>The Vision Finance Company (World Vision)</i></p> <p><i>CARE Rwanda</i> Presence in Rwanda for over 20 years.</p>

	Grameen Village Phone (Bangladesh)	MTN Village Phone (Uganda)	Rwanda Pilot project (Rwanda)
		<p>POST BANK (joined Jan '05) Incorporated in 1998 to take over the operations of the former Post Office Savings Bank, wholly government owned. With its presence in the Arua, Gulu and Lira districts in the northern part of Uganda, Post Bank significantly strengthens the geographic coverage of MTN Village Phone.</p>	
Role of MFI	Selection, financing initial purchase, billing, collection, support	Selection of VPOs, financing initial purchase	
Call charges	Incoming and outgoing	Outgoing only	
Country teledensity	2005: 4 per 100 inhabitants	2003: 0.27 per 100 inhabitants 2004: >4.2 per 100 inhabitants	
<p>Note: Given that the Rwanda operation is still in a pilot phase, there is little information available on it at present.</p>			



Smart Subsidies – Getting the Conditions Right: The experience of expanding rural telecoms in Nepal

Harsha de Silva & Ratna Kaji Tuladhar

1. Introduction

This chapter investigates conditions that make smart subsidies successful in bridging access gaps in rural telecom services using Nepal's Eastern Development Region project as a case study. The study finds that while smart subsidies can be used to initiate the provision of services to rural communities, the real question is whether such services can be sustained in the medium to long term. The findings converge upon the point that unless certain regulatory conditions are in place, particularly with respect to cost-based asymmetric interconnection agreements and effective regulation of incumbent's anti-competitive practices, the success of rural telecom service providers who are empowered by smart subsidies will be questionable.

In addition to an unfavourable regulatory environment, Nepal is currently undergoing a serious security problem. This has impacted the already weak project, threatening its very existence.

From a policy perspective, the findings of this study lead to probing the wisdom of separating the market efficiency gap and the access gap in terms of sequencing market liberalisation programs and smart subsidy projects. The findings indicate that it might be more useful to consider addressing rural connectivity issues from an integrated and continuous regulatory subsidy angle instead of separate solutions for the distinct gap problems.

2. Background

In most countries, supply of telephony has traditionally been skewed towards the urban affluent as opposed to the rural poor. The literature dichotomises this urban/rural gap using a market efficiency gap and access gap concept.¹ The market efficiency gap is the difference between what markets actually achieve under existing conditions and what they could achieve if market barriers were removed. This gap can be bridged via effective competition, private provision of services, and market-oriented policies and regulations that create a level playing field, particularly for new entrants. The access gap on the other hand refers to people and places that remain beyond the limits of the market due to inadequate income levels or its skewed distribution. Bridging this gap requires intervention in the form of subsidies to encourage services providers to enter these areas.

Closing the access gap through the provision of subsidies is not a straightforward task. A number of policy and regulatory complexities have to be considered. The sequence of implementation is also important. While there is no convergence in the literature as to an ideal sequence of implementation of policy to bridge the two gaps in terms of coverage milestones, experts have argued that it is better to bridge the market efficiency gap significantly prior to starting on bridging the access gap. Given that it is theoretically true that liberalisation and competition within an efficient regulatory regime would successfully bridge the market efficiency gap, how long should policymakers wait before implementing access gap policies? What if very little liberalisation has taken place? It must be noted that in the pre-liberalisation era, during which time monopoly operators had the opportunity to cross-subsidise less profitable rural service provision with more profitable

urban services, some degree of bridging access gaps did take place, particularly with the building of backbone, albeit for their own use during a later competitive regime. However, in every country, the bulk of this gap remained at the time liberalisation occurred.

In addition to policy and regulatory complexities, there are geographic and socio-economic complexities that need to be considered prior to designing access gap bridging policies. Primarily these are the size and terrain of a country; population density of the settlements; income levels and distribution among the population.

The bottom line is that unless these ground realities are factored in when innovative subsidy schemes are designed to bridge access gaps, they will almost certainly fail.

Once a subsidy policy is designed and developed to bridge the access gap, in pursuit of either universal service or universal access, it becomes necessary to obtain funds for the purpose. Almost always the required investment comes from special universal service funds which are usually referred to as telecommunication development funds. Normally, these funds are financed by a number of sources: government budgets; development agencies such as the World Bank (typically seed funding); licence fees and spectrum auctions; operator revenue contribution and interconnection levies, such as access deficit charges.

The final act is to distribute the funds to bridge the access deficit through a well-defined program. In the case of this chapter, the program is referred to as a smart subsidy program. Smart subsidies refer to the process used to provide the minimum required subsidy to bridge a defined access gap using a competitive bidding process known as least cost subsidy (LCS) auctions. Here bidders are forced to consider the most cost-effective technology and other cost saving options to bid for the lowest required subsidy – if at all. LCS auctions are very different from the alternate provision of subsidy using a compar-

ative evaluation scheme known as a ‘beauty contest’ where the award is determined on a merit-based assessment of the applicant’s ability to fulfil a given set of requirements. In countries with poor governance frameworks, it is safer to use the smart subsidy approach where only one number is evaluated rather than giving a significant degree of discretion to the tender board evaluating the bids.

3. Rationale for least cost subsidy (LCS) auctions in Nepal

This section intends to shed some light on the conditions under which smart subsidy programs to bridge the access gap in rural telephone services could be successfully implemented. We take Nepal as a case study because it is the first such project in Asia.²

3.1 Geography: Rough terrain

Nepal is a least developed Asian country measuring 147,181 square kilometres. The major part of the country consists of high mountains and rolling hills, which account for 83% of the land area. The flat land, or Terai, occupies the remaining 17%.

3.2 Population: Rural and poor

Nepal’s population is approximately 25 million. Of this number, 87% live in rural areas. Only 57% of Nepalese are literate and per capita income is just USD 260 (2004). In terms of access to public utilities, a mere 17% have access to electricity and this drops to 5% in rural areas.

3.3 Administration: Complex and unstable

Nepal is a multiparty parliamentary democracy within the framework of a constitutional monarchy for which the Head of Government is the Prime Minister. However, since 1996 Nepal has been caught up in a disruptive civil war with Maoist rebels fighting for a republic. Administratively, the country is divided into five development regions: Eastern, Central, Western, Mid-Western and Far Western. These development regions are further divided into 75 districts. Each district is then divided into small administrative units called Village Development Committees (VDC) and Municipalities. Altogether, Nepal has 3,914 VDCs and 58 Municipalities.

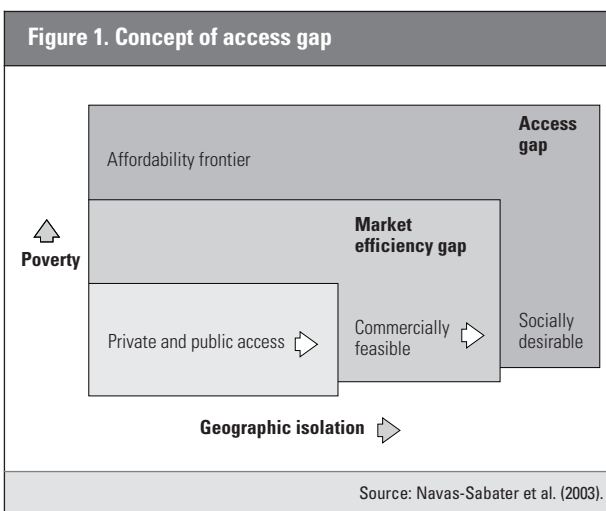
3.4 Telecom network development in Nepal

3.4.1 History: Long

Telecoms started with the installation of an open wire trunk line between Kathmandu and Raxaul (a border town in India) in 1914. The first manual telephone exchange with 100 lines was commissioned in 1950 but sector development started in earnest in 1969.³

3.4.2 Present status: Unsatisfactory

Nepal, a least developed country, faces enormous socio-economic problems that have been exacerbated by the uncertain



security situation. The vast majority of people do not have access to minimum public utilities and have enjoyed only marginal benefits from past investments in telecom.

Nepal's fixed teledensity is a mere two telephones per 100 persons (NTA 2005). The waiting list exceeds the number of telephones available. The breakdown of service provision is shown in Table 1.

Whatever growth took place since 1969 occurred through the incumbent operator. However, the penetration of telecom facilities was not geographically uniform. As at October 2005, more than half of all telephones (269,910 fixed lines or 56.3%) were concentrated in the Kathmandu Valley. Many rural areas have little or no access to telephone services of any kind. Rural teledensity is only 0.2 per 100 persons.

Table 2 provides an overview of the technology used by the incumbent NTC to serve the rural areas in Nepal as at present. It shows a clear bias for VHF/UHF radio technology.⁴

3.4.3 Competition in the sector

With a view to accelerate development of telecom services in Nepal, or in other words to bridge the market efficiency gap, His Majesty's Government of Nepal (HMG) made a policy decision to liberalise the sector by introducing private participation via the Telecommunication Act of 1997. One year later, in 1998, the Nepal Telecommunications Authority was established.

3.4.4 Nepal Telecommunications Authority (NTA)

Nepal Telecommunications Authority (NTA) is an autonomous regulatory body created for the "development of telecommunication services in the country." In addition, it is charged with assisting the Ministry of Information and Communications (MOIC) in the formulation of telecommunication policy, preparation of legislation and formulation of rules and regulations for the execution and implementation of such policy. In

order to meet the increasing demand for services through private participation, NTA has identified a number of aims:

to make the telecommunications service reliable and easily available to the public; to make necessary arrangement to avail basic telecommunications service and facilities in all rural and urban areas throughout the Kingdom of Nepal; to protect the rights and interests of consumers by ensuring the provision of quality service; to make arrangement for the coordination and healthy competition among the persons providing Telecommunications Service and facilities.⁵

Data for growth figures of telecom services, however, do not indicate the successful outcomes of the functions performed by NTA. To understand the internal functioning of NTA, which is most important for implementation and sustainability of the Nepal smart subsidy project, it is imperative to examine its structure, cadre and functioning.

NTA consists of a Board of Directors appointed by HMG for a period of five years and eligible for reappointment for a second term. The Board is responsible for general policy and supervision; and a management team is responsible for day-to-day operations. The Board consists of five members including the full-time working Chairman who in turn is also the Chief Executive Officer of the Authority. Although the Board has provision for five members, it only achieved this number in August 2005.⁶ Besides the Chairman, the management cadre consists of a Manager and five Deputy Managers. However, since inception, the Manager post has been vacant and of the five Deputy Managers, three posts remain unfilled. Interviews with the Chairman and senior officers revealed that NTA severely lacks professional capacity and is ill-equipped for its duties. See organisation structure in Annex 1.

3.4.5 NTA strategy for providing telecom in rural and remote rural areas

In light of rapid development in telecom technology, increasing market demand and dynamic changes taking place in the telecom structure, albeit relatively slowly compared to the region, Nepal's Telecommunication Policy 1999 was revised in January 2004 and a new policy was announced. The para-

Type of service providers	Number of License Holders	Total Number of Customers
Fixed using wired line	1	461,783
Fixed using WLL	2*	36,000
Fixed using VSAT	2	970 (STM 542 NTC 418)
Mobile	2#	285,714
GMPCS satellite phone	2	800
Total	0	748,073

* Nepal Telecom expected to start WLL service from November 2005. Telephone lines shown are the customers belonging to UTL, service provider from private sector.

Spice Cell, another private operator, was expected to start mobile service in September 2005.

Digital C-DOT (wire-line) exchanges	190
MARTS	472
VHF/UHF radio	1087
Digital microwave (JICA project)	3
HF radio	4
VSAT	7
VDCs served with at least one PCO	1711

Source: NTC 2004/2005.

mount objective of the Telecommunication Policy is to “create a favourable environment in order to make the telecommunication service reliable and accessible to all people at the reasonable cost throughout the Kingdom in collaboration with the private sector in order to support the social and economic development of the country.”

The following objectives have been identified to “give support for accomplishment” of the above objective in terms of extension of service to the rural areas: “In order to bring the access of general public of rural (and urban) areas of the Kingdom to the telecommunication service, arrangements shall be made in a manner that the telecommunication service shall be available within the shouting distance in the inhabited areas” and “arrangements shall be made for having opportunity to use appropriate information and communication technology for poverty alleviation and development of the rural areas.”

The key features of the strategy adopted to achieve the objectives, as relevant to the study are:

- Universal Access, wherein “The telecommunication service shall be made available to the consumers through the shared telephone. Emphasis shall be given to extend telephone as fixed, mobile, etc. therefore. The satellite system may also be applied for extension of service.”
- Liberalisation of the sector, wherein “The telecommunication sector is kept open for the service providers. However, the number of the service providers may be limited by virtue of radio spectrum.”
- Open licensing regime to be applied, wherein “Transparent methods shall be applied upon granting such license. Moreover, an environment for healthy competition shall be created.”
- Private sector participation to be encouraged, wherein “Foreign investment shall be attracted and arrangement shall be made to regularly inform private sector about the particulars of reform taken place in the telecommunication sector and about the opportunity available in this sector also.”
- Commercialisation of NTC, wherein the “Nepal Telecommunications Corporation shall be converted into a company and the ownership of His Majesty’s Government shall be gradually decreased.”
- Institutional development of implementation of policy wherein “For successful implementation of the Telecommunication Policy, the institutional development shall be gradually made by increasing human resource and economic capacity of the Ministry of Information and Communication and the Nepal Telecommunication Authority.”
- Economic efficiency of the sector, wherein “Emphasis shall be given to increasing economic efficiency of the sector by creating an environment that promotes healthy competition among service providers.”

3.4.6 Telecom status in the VDCs: A long way to go

Every municipality and almost all commercial centres have at least one digital telephone exchange interconnected with the backbone with either optical fibre or digital microwave. On the other hand, the availability of telephone facilities in VDCs is very different. At the time the LCS was being designed, more than half of the total 3,914 VDCs had no access to any telecom service. Even though HMG had attempted to extend service to 2,700 VDCs in its ninth five-year plan (1997/98 - 2001/02) and complete the provision of telephone services in all the VDCs by the end of the tenth five-year plan (2002-2007), the outcome at the end of the ninth was only 1,711 VDCs.

3.4.7 Access gap: Service providers have not gone to rural areas

As defined earlier, an access gap refers to places and people that lie beyond the market due to inadequate income, or more correctly, net income, which is revenue over cost. Notwithstanding monopoly profits and cross subsidies, the incumbent NTC had found it difficult to justify extension of their networks to the remote areas of the country. Post-liberalisation, even though marginal, the incumbent has found this justification even more difficult. The majority of Nepalese villages not only have very difficult terrain, and thus high cost, but they are also uneconomical from the perspective of extending telephone services because of low revenue.

From the supply side of the equation, the main issues are:

- Adverse terrain
 - technology feasibility is a problem
 - high cost for transportation and installation of whatever equipment
- Non-availability or inadequate supply of electricity
 - high operational and maintenance cost

In addition to supply constraints increasing costs, the general perception among operators is that people in these areas would not be able to afford the cost of calls and therefore rev-

Table 3. Number of VDCs covered by NTC before the LCS auction

Region	VDCs in each region	VDCs with telephone facilities	Percentage of coverage
Eastern Development Region	893	359*	40%
Central Development Region	1,199	547	46%
Western Development Region	864	417	48%
Mid Western Development Region	575	207	36%
Far Western Development Region	383	181	47%

*52 VDCs were added by Nepal Telecom between the first and second subsidy tender.

enue generation would be unsustainably low.⁷ The demand side of the equation is thus constrained by:

- Sparse, uneven and scattered population distribution
 - difficulty in generating break-even volumes of business
- Poor economic conditions
 - very low income and therefore low expenditure on telecommunications
 - most calls are long distance and hence charges are higher than local calls, hence unaffordable

Further aggravating the situation is the present crisis in Nepal due to the Maoist insurgency that has either completely destroyed or damaged a number of telecom installations in rural areas. Given this background, service providers are even more reluctant to extend the network into these areas.

3.4.8 Rural Telecommunications Development Fund

Given the background of sector reform being undertaken to liberalise the market and bridge the market efficiency gap, NTA established a Regional Telecommunications Development Fund (RTDF).

The rationale for the RTDF was to fund subsidies to bridge the access gap. Funds were to be collected through a levy of 2% of gross annual income from all licensees supplemented by any other allocations by HMG or donor agencies.

4. Nepal smart subsidy: Design and implementation plan

In context of the failure of the incumbent, NTC, to bridge the access gap in rural areas of Nepal within a reasonable time-frame, and hardly any activity by the private operators in addressing the issue, discussions began between HMG through the NTA and the World Bank to consider alternate mechanisms to service these areas. Based on extensive discussions, *inter alia* taking into consideration that private investments in Nepal were dismally low due to the unfavourable conditions prevailing in the country, it was decided to select one administrative region and implement a private sector led regional telecom services (RTS) program through the provision of a possible subsidy, as a pilot.⁸

The Eastern Development Region (EDR) was selected as the licence area where the eventually successful licensee would be responsible for rolling-out the RTS. Given that the RTDF was not yet in operation, the World Bank agreed to provide funds for implementing this RTS under a long-term credit to HMG.

Having considered the many options available and lessons learned in Latin America, the NTA and the World Bank agreed that it would be more appropriate to call for international competitive bidding, as opposed to a negotiated contract. The mechanism was to use a one-time capital subsidy to be paid to a new licensee, selected using a smart subsidy, or more formally a least cost subsidy auction process.

4.1 Design and implementation

The salient features of the licence design and implementation plan developed jointly by NTA, their consultants and the World Bank and contained in the Request for Application (RFA) are as follows.⁹

4.2 Design

4.2.1 Licence area

The coverage area was specified as 534 VDCs in the Eastern Development Region (out of a total of 893 VDCs) with a rural population of four million. Geographically, the coverage area included extremely remote VDCs in the mountainous areas in the northern Himalayas (Mount Everest is situated in the EDR), remote VDCs in rolling hills in central Nepal, as well as accessible VDCs in the Terai or flat land in the south of Nepal. In terms of income diversity, the region included settlements rich in agriculture as well as the remote but rich tourist areas along the Mount Everest trail. It also contained a number of very poor and extremely remote areas.

4.2.2 Exclusivity

The licence was to be issued on a non-exclusive basis to serve the EDR. However, the important point was that, pursuant to the Telecom Act, HMG through NTA agreed not to authorise NTC or grant any new licences to any existing or new operator to provide RTS in the identified VDCs for a period of five years after the licence was issued. The logic for the five-year exclusivity seem to lie in the view that the five-year duration would help the licensee build its own network and broaden its customer base prior to competition setting in.

The designers nevertheless took adequate precaution to limit the risk in the event the licensee failed in its obligation. The RFA clearly noted that if the licensee failed to fulfil the identified roll-out requirements, the NTA could, at any time, authorise NTC to provide RTS in any of the identified VDCs that remained without service.

4.2.3 Technology and network roll-out requirements

The design and implementation plan called for the licensee to install, activate and operate at least two separate public access lines in each identified VDC. The lines were supposed to be installed in two different Public Call Offices (PCOs) located in different wards of each VDC.

In terms of technology to be used, NTA and the World Bank were of the view to let the applicants decide on their choice of technology-based on the existing infrastructure, geo-demographic and socio-economic conditions in the EDR. The RFA stated: “The Licensee may utilise any appropriate wireless or wire-line technologies in the provision of the RTS in the Regional Service Area.” This however was qualified to the extent that the applicant’s proposal had to meet the eligibility requirements and service quality criteria identified in the RFA.

The implementation plan also called for 50% of the VDCs listed being served within nine months of the effective date of the licence and 100% served within 18 months. For the pur-

pose of these roll-out requirements, an access line was to be considered to be activated when an independent technical consultant, appointed by the NTA, certified that incoming and outgoing local, domestic long distance and international service could be obtained from the line, and the pre-specified service quality criteria for call completion were satisfied.

The RFA specified that the licensee's failure to meet the network roll-out requirements could result in the loss of eligibility for the RTS subsidy, forfeiture of the performance guarantee, termination of the licence, imposition of fines and even the forfeiture of all equipment, land and other assets related to the RT service.

In designing the project, however, NTA and the World Bank took into consideration the security uncertainty prevailing in Nepal at the time and stated in the RFA that these penalties were not to be applied if the roll-out delay resulted solely from an event of *force majeure*. In that event, the RFA stated that NTA would be prepared to modify the locations.

4.2.4 Scope of service

The RFA specified that the eventual licensee would need to provide *basic public telephone service* consisting of local, domestic long distance (STD) and international long distance (ISD) as mandatory services. Free access to emergency dialling, *directory assistance* and a consumer complaint centre were also deemed as mandatory services. Once the above requirements were fulfilled, the licensee was to be authorised to provide additional individual or public telephone access services, whether residential or commercial, in any location in the EDR.

In addition to mandatory services, Internet access, email, voice mail, fax, audio conferencing, prepaid calling card services and data communication services were also authorised in all of the identified 534 VDCs at any time, as well as the entire Eastern Development Region, once roll-out obligations were met.

4.2.5 Domestic long distance services (STD)

The design entailed a provision that prior to 1 January 2004, the licensee could use its own facilities to carry STD traffic within the Regional Service Area or between licensed VDCs in the service area and Kathmandu. For all other STD traffic, the licensee was restricted to the domestic long distance carriage facilities of NTC. However, this restriction was to be relaxed from 1 January 2004 when the licensee would have the right to obtain a separate non-exclusive licence to provide STD services provided it met the necessary requirements as specified by NTA for all STD service licences.¹⁰

4.2.6 International telecoms services (ISD)

As in the case of STD, the licensee was restricted to use of the international gateway and other international traffic carriage facilities of NTC until 1 January 2004. Thereafter, upon application, the RFA clearly states that the licensee has the right to obtain a national licence to provide ISD services using its own

international gateway, provided it meets the necessary requirements as specified by NTA for all ISD service licences. The licence fee payable by the licensee for the ISD services licence would be the same amount and payable under the same conditions as the NTC licence fee.¹¹

4.2.7 Service quality and availability obligations

The design included a service quality segment obligating the eventual licensee to meet standard minimum quality and availability of service (see Appendix 2).

In addition to quality criteria, the licensee was also bound by a number of service availability criteria. The key availability criteria stipulated that each PCO be open and available to any member of the public to make local, STD and ISD calls during reasonable daytime and afternoon hours (suggested 0900 to 1700 hours), totalling a minimum of eight hours, every day of the week. Where a PCO did not have access to the electrical power grid, the RFA called for the licensee to provide an alternate source of power for the PCO, sufficient to provide a minimum of four hours total of actual local, STD or ISD calling services within the eight hours it is open daily.

The licensee was to ensure that the services made available through the installation, activation and operation of two separate access lines in two PCOs located in two different wards separated by at least two kilometres in each identified VDC listed and the provision of basic telecom services to the customers through the PCOs were continued throughout the period of the licence validity.

4.3 Regulatory environment

Regulatory risk has been defined by Spiller and Levy (1994) as "the risk emanating from government action including but not limited to the actions of the actual sector specific regulatory agency with authority over the industry in question." It therefore flows that the particular regulatory risk environment within which telecom operators and potential new entrants function is the telecom regulatory environment (TRE). The obvious logic is that as the TRE becomes more favourable, the market efficiency gap will narrow.

The World Dialogue on Regulation for Network Economies (WDR) and LIRNEasia research on the relationship between TRE and private investments in telecom (both new and reinvestment of internal funds) has identified a number of important correlations. Key among them is that a favourable TRE is without a doubt one of the most important factors for attracting private investment and sustaining reinvestment in telecom in several developing country economies to bridge the market efficiency gap (see Samarajiva and Dokeniya 2005). In addition, other studies have found that a bad regulatory environment would not help subsidies to bridge the access gap either. In fact, the funds could be wasted.

Given that the TRE in Nepal had numerous shortcomings, the NTA and the World Bank were deeply concerned that for the RTS to succeed they needed to ensure that the Nepal TRE would, at the least, not be detrimental to the proposed project.

In order to ensure the above, NTA and the World Bank undertook a number of precautionary measures.

The following sections consider these measures in relation to the TRE methodology developed by LIRNEasia (documented in Samarajiva and Dokeniya 2005). The five dimensions of this methodology are market access, access to scarce resources, interconnection, tariff regulation, and regulation of anti-competitive practices. The following assessment is not a comprehensive TRE analysis but merely the use of the five TRE dimensions to provide clarity of discussion.

4.3.1 Market access

Market access was guaranteed through a licence. One RTS licence would be issued for the EDR and depending on the performance of the same further licenses would be issued for other regions.

The initial term of the licence to provide RTS in 534 VDCs was set at ten years. However, the licensee would enjoy exclusive service provision in the first five years. Thereafter the license would become renewable for five-year terms for the duration of a 25-year term. NTA was expected to grant the licence renewals automatically provided that there were no material breaches of the licence.

The licence fee was stipulated at a very low level of NPR 100,000 (approximately USD 1,250) for the initial period of ten years. The successful applicant was expected to pay this licence fee in full at the time of issuing the licence. The renewal fee for each additional five-year licence term was set at 4% of the eventual licensee's gross annual revenues for the fiscal year immediately preceding the start of the relevant renewal period. The eventual licensee was also expected to pay a royalty fee of 4% of gross annual revenues for each fiscal year to NTA who would then pass it on to the treasury.

For the first five years, the eventual licensee would be exempt from the RTDF levy, but beginning in the sixth year, the RFA specified that the licensee would have to annually contribute 2% of its gross annual revenues to the RTDF.

During the first five years after issuance of the licence, prior written consent of the NTA had to be obtained for any change in the ultimate beneficial ownership of any shares of the licensee or for any change of control of the licensee. Except in extraordinary circumstances, the NTA did not foresee consenting to any such change during the first five years of a licensee's operations.

4.4 Access to scarce resources

4.4.1 Frequency

Given the design's technological neutrality, the RFA allowed for the eventual licensee to use any wireless technology and/or satellite services in providing RTS as long as they met the identified technical requirements and service quality criteria.

MOIC and NTA were expected to coordinate radio frequency allocation to the licensee for the selected technology and in accordance with applicable frequency management practices and international obligations. The RFA noted that the eventu-

al licensee was required to pay fees on an annual basis for the spectrum licence calculated on the same basis and payable on the same conditions as the fees charged to NTC pursuant to NTC's spectrum licence. However, the eventual licensee was to be exempted from paying spectrum fees as long as NTC was exempted from paying them.

4.4.2 Right of access

The RFA noted that the eventual licensee would have rights of access to public and private lands and also the rights of inspection and entry set out in the Telecom Act.

4.4.3 Interconnection

The process of interconnection between the eventual licensee's network and other licensed telecom networks in Nepal, including that of NTC, was to be governed by the Telecommunication Act's Interconnection Guideline.

The main objective of the Nepali Interconnection Guideline is to ensure that any customer of a particular telecom network can communicate with any other customer in another telecom network efficiently and without unnecessary impediments. The guideline is expected to ensure healthy competition by safeguarding against abuse of market power by the incumbent. The guideline also provides for the licensees concerned to discuss and arrive at an agreement on the use of networks and charges for this use. Licensees are given every opportunity to resolve issues commercially before resorting to regulatory intervention. Only if the parties are unable to resolve the issue and request the NTA's intervention, will the NTA intervene to resolve the interconnection issue. If the NTA is unable to bring the two operators to an agreement then it will issue its binding determination.

While the RFA for the RTS in the EDR did not specify a particular interconnection charge between the eventual RTS licensee and the incumbent NTC, the charge was eventually, but prior to actual award of the licence, agreed as 55% of NTC's own VSAT tariff as the interconnection payment by the licensee to the incumbent.¹²

4.4.4 Tariff regulation

The tariff rates charged by the eventual licensee to its customers for use of the regional telecom services were to be subjected to regulation by the NTA in accordance with the Telecom Act. Except with prior approval from NTA, the eventual licensee was not authorised to charge tariffs higher than those set out in the table entitled RTS Maximum Tariffs and Default Interconnection Rates in the RFA (see Annex 3).

This tariff was announced in the RFA as NPR 9.00 per minute for intra RTS calls (originating and terminating on the RTS system) as well as outbound calls (originating on RTS and transiting via NTC).

This tariff regulation policy seem to have adopted the successful experiences of the Latin American program, in which operators were allowed to set cost reflective tariffs in the rural areas.

However, the design called for the maximum tariffs to be subject to price cap indexing after 2004, based on a formula to be developed by NTA.¹³

4.4.5 Regulation of anti-competitive practices

The RFA clearly stated that the NTA would regulate NTC to ensure that it did not unfairly discriminate against the licensee, grant anti-competitive preferences or cross-subsidise its own RTS operations. The RFA further elaborated that the RTS operations of NTC would be regulated by the NTA to ensure that NTC did not abuse its dominant position as the incumbent telecom operator in Nepal. It also undertook to ensure that any authorisation granted to NTC in the RFA of the eventual licensee would contain terms and conditions equivalent to those applicable to the licensee.

This was a very important undertaking as it afforded a level of comfort to the possible bidders in terms of the possible anti-competitive behaviour of the incumbent.

4.5 Eligibility and qualifications

It appears that the design of the LCS auction by the NTA and consultants to the World Bank intended to maximise the number of potential players that would become eligible to bid in the auction for the RTS licence as the eligibility conditions did not appear overly restrictive. The key conditions are given below:

- Must become registered as a company in Nepal prior to the Licence being issued;
- Nepalese investors must own minimum of 20% equity;
- Must satisfy the NTA with regards to financing capacity for completing roll-out of the network in accordance with the terms of the Licence;
- Must provide clear evidence of operating either a telecom network with over 250,000 subscribers, or a telecom network with over 500 public telephone access lines in rural areas;
- Must demonstrate that the proposed suppliers of the equipment have been in the business of manufacturing the said equipment for at least five years; and
- Must furnish a Bid Security of USD 100,000.

4.6 Selection and implementation

The RFA was very clear in indicating how the selection process was to be conducted using a single round LCS auction. It stated, “The NTA plans to issue the Licence and the RTS Subsidy to the Licensee proposed by the Qualified Applicant that proposes the lowest RTS Subsidy.”¹⁴

It is important to note that unlike some previous LCS auctions no maximum subsidy amount was announced, taking the position that the ‘market knows best’ and also guarding against bidders concentrating on the maximum allowable subsidy.

The implementation plan of the RT network and thereby the payment plan of the RTS subsidy determined by the winning bid of the LCS auction was straightforward. The RFA stated that the one-time grant was to be payable in four tranches as follows:¹⁵

- the first tranche of 40% once the International Development Association (IDA) receives written confirmation from the NTA that 534 access lines have been activated and are in operation;
- the second tranche of 40% once IDA receives written confirmation from NTA that 1,068 access lines have been activated and are in operation;
- the third tranche of 10% as soon as possible after the end of the first year after the activation of services in all identified VDCs provided that quality of service standards as described have been maintained; and
- the fourth tranche of 10% paid to the licensee at the end of the second year after the activation of services in all identified VDCs provided that quality of service standards have been maintained.

If NTA provided written confirmation to the World Bank that one or more events of *force majeure* prevented the installation, activation or operation of some of the access lines required to be installed, then the amount of the second, third and fourth tranches of the RTS subsidy were to be reduced by an amount proportionate to the number of access lines that the NTA had confirmed to have been reduced by the events of the *force majeure*.

The obvious question that arises is that of sustainability. What would happen if the eventual RTS licensee abandoned the operation in the event that the RT operation became unprofitable after the subsidy had been received for just two years of a 25-year licence period? This issue is addressed later in the chapter.

5. Nepal LCS auction outcome

Given the design and implementation plan for the RTS subsidy using a least cost subsidy auction, as discussed earlier, NTA commenced the bidding process for the RTS license following intensive dialogue with the World Bank.

This was the second attempt of the LCS auction. The first attempt was in September 2000, for which NTA received two bids and the applicant with the lowest subsidy signed a letter of intent to undertake the project. However, with the unprecedented incident that left many members of His Majesty's family assassinated and the deteriorating security situation with rising Maoist violence, the party decided to withdraw from Nepal, forfeiting its bid bond. Against this backdrop, HMG and the World Bank undertook a total review of the program and weighed the options of suspending the project versus improving the attractiveness of the offer by including conditions to mitigate the country risk and enhance financial attractiveness. Finally, NTA and the World Bank decided to go with the second option.

Prior to the formal bidding process, NTA and the World Bank made the draft RFA publicly available for review and consultation on NTA's website between June and December 2002. According to the World Bank the transparent public consultation process resulted in NTA improving the quality of the RFA in response to market needs.¹⁶ The revised RFA documents were made available for purchase in February 2003; a pre-bid conference with six potential bidders was held in April 2003; and applications for the RTS license were received in June 2003.

During the bidding process some potential applicants raised additional concerns related to the financial, regulatory and security risks. To mitigate some of the concerns additional changes were made to the proposed RTS license.

One of the major concerns addressed was the need for revising terms for advancing payment prior to project start-up. These resulted in the following adjustments:

1. Subsidy payments to be made at the time of activation of the percentage of VDC lines. For example, the first 20% subsidy payments were to be made as soon as the lines were activated in 20% of VDCs, even if that occurred before six months.
2. If the licensed service utilised VSAT technology, 20% of the total subsidy was to be paid upon activating the VSAT network hub station, which had to be based in Nepal. The rest of the payment schedule would be 20% of the subsidy upon activation of lines to 20% of VDCs; another 50% of the subsidy upon activation of 50% of the VDCs (for a cumulative total of 70%); and a further 20% (total of 90%) upon activation of all lines. The last 10% was to be paid at the end of 24 months after awarding the licence.
3. If the independent consultant were to certify that the RTS licensee was prevented from serving some of the VDCs due to *force majeure* events, the NTA could approve a list of alternative locations within which PCOs could be installed.

The locations on this list would generally be equally remote to those locations where the PCOs could not be installed. If PCOs were activated in accordance with the alternative PCO locations, there would be no reduction in the subsidy payments.

However, even after all the above changes were effected, the LCS auction process attracted only two bids. One was disqualified on technical grounds.¹⁷ Incumbent NTC was not allowed to bid.¹⁸

Therefore, based on the only bid received, the RTS license was awarded in November 2003 after ensuring compliance with licensing requirements, filing of a consortium shareholder agreement and registration with the Department of Industry, and receipt of the performance guarantee.

5.1 Details of the LCS auction award

Licensee:	Messer STM Telecom Sanchar Private Limited of Kathmandu, Nepal (USA-based); Messer Apollo Investment Group is the Nepali shareholder with 20% share.
Licence issue date:	21 November 2003
Roll-out completion date as per licence:	16 June 2005
Licence validity:	Ten years extendable by five years up to 25 years.
Subsidy amount:	USD 11,865,000
Total number of PCOs to be installed under the subsidy amount:	1,068 in 534 identified VDCs of the EDR
Work progress as at 1 October 2005:	Installation of the Kathmandu hub station began in early March and was certified on 29 April 2004. The hub station at Biratnagar and installation of 20% of locations was commissioned on 26 August 2004. 541 PCOs in 271 VDCs (50% milestone) was commissioned on 14 January 2005. As of October 2005, 70% of the contract amount had been disbursed.
Districts covered:	10 out of 16.
Number of PCOs currently in operation:	197; mostly in the Terai region. 341 locations closed down under orders from HMG.
Installation monitoring, evaluation and certification by:	Planetworks Consulting Corporation, Canada

6. Nepal Smart Subsidy: Design and implementation issues

Nepal is undergoing a serious security problem with Maoist rebels having been waging an armed campaign against the state since 1996, during which time some 11,500 Nepalese have been killed. It is not uncommon for hartals to shut down entire cities and villages, and explosions take the lives of many persons at a time. Sometimes main arteries are shut down for days preventing any form of traffic. In certain areas where the Maoists have control, the entire administration is run by them with no reference to government rules.

The security situation has been non-conducive from the initial stages of the RTS project, which in a sense is something that should have been, and in all likelihood was, calculated in the bid submitted by STM. Risk premiums that have to be borne in terms of additional costs would certainly have been included. Although the Maoists created problems during the initial stages of roll-out of the RTS network, progress was very much on schedule until mid-January 2005, when 542 PCOs in 271 VDCs were completed.

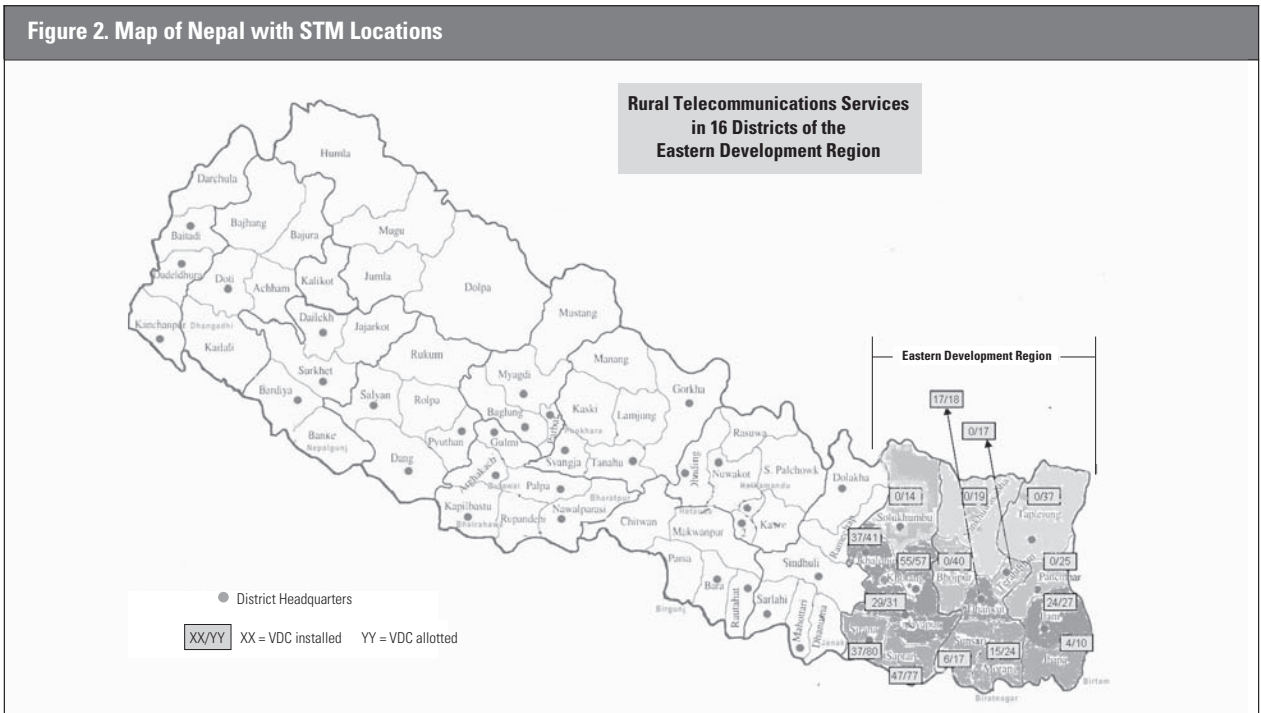
However, the conflict took a different turn when His Majesty assumed direct rule and took over executive powers on 1 February 2005. The king sacked the Prime Minister, dismissed his government and declared a state of emergency. With this state of emergency, HMG ordered STM to shut down all 542 PCO locations.¹⁹ Subsequently, HMG permitted STM to reopen 25 out of the 542 locations and by end of August 2005, HMG had

allowed STM to operate 197 PCO locations in total. In the meantime, STM has been complaining to the authorities that they were unaware of the condition of their equipment in the remaining 345 locations as it had not been possible to even visit these sites due to the numerous restrictions placed on them. However, NTA continued to complain that STM was not interested in relocating these PCOs to other safe areas because they had already collected payments (subsidy) for their installation.

In late August 2005, HMG granted permission to STM to restart its implementation program and provided a list of 177 new locations. However, these new locations had been determined by the army without reference (it is alleged) to whether STM could undertake viable operations in those VDCs given that NTC was already present in them. Here it appears that NTA has not been able to convince the defence establishment of the logic for selection of VDCs and why certain VDCs should be left out and others brought in.

From the perspective of successful implementation of the project, there is no doubt that a more conducive security environment would have helped. However, in reality, the ground situation is such that all stakeholders – NTA, NTC, STM and the World Bank – needed to have factored in the unpredictable nature of the situation in Nepal.

It is in this context of non-security related issues, that particularly the action of NTA in ensuring a TRE within which STM could successfully implement and sustain the RTS becomes vitally important.



6.1 Design and implementation

An issue that has attracted strong opposing views was the continuation and subsequent conclusion of the LCS auction given there was only one eligible bidder, STM.

While some quarters, including NTA and the World Bank see no reason why the auction process should have been suspended under the above conditions, there are others who argue that going ahead with just one eligible bid was a perhaps a significant error in judgement. This is even more noteworthy given that consultants to the World Bank are said to have approached more than 100 potential international entities with the RTS opportunity and reported that there appeared to be “sufficient interest from serious bidders to run an auction.”²⁰

Simple economic analysis suggests that for any auction to be successful, be it a single round or multiple round auctions, there must be competition among bidders. The thinking behind the LCS auction is no different to this. Thus from a purely economic point of view of obtaining the lowest possible bid, albeit agreeing that the decision to go ahead with the auction with one bidder was much more complex, this might have been reviewed further.

6.1.1 Licence region and exclusivity

It was the failure of the incumbent, NTC, to address the rural areas of Nepal within a reasonable timeframe that led to carving out the EDR as the licence area with 534 VDCs within which STM was responsible for rolling out its network. In line with this logic, NTA guaranteed exclusivity to STM for the first five years – no new service provider was to be given a licence to provide service, nor was NTC allowed to provide any service in these 534 VDCs. Besides the incumbent’s history of failure, this decision was rooted in considering the economic activity and hence the traffic in these areas, where introduction of competition prior to STM building its network and consolidating its customer base was not seen as advisable in terms of sustaining more than one service provider.

However, our research revealed that from the date of selection of STM via the LCS auction until the time our research ended (November 2005), NTC had extended its services to more than 100 of the 534 VDCs exclusively earmarked for the STM. This serious violation was not only against the licence conditions, but also against the spirit of the entire telecom policy.

In fact, neither NTA nor the World Bank were initially unaware of this. The World Bank mission that visited Nepal in September 2004 noted in their observations that NTC PCOs existed in 49 of 107 VDCs where STM had been licensed to provide services on an exclusive basis. The World Bank mission reiterated that the 534 VDCs had been identified jointly by MOIC, NTA and NTC and that it had been agreed that these VDCs would be the exclusive service area of the RTS operator for five years. Based on this finding, the World Bank and HMG agreed that such overlap should be avoided in the future and that MOIC and NTC would coordinate with NTA and STM to ensure that NTC did not provide services in the RTS operator’s

exclusive service area. They also agreed that given the situation on the ground there was a need for flexibility and that it was necessary to delete or substitute other VDCs in the EDR in agreement with STM with a view to ensuring that the objectives of the RTS project were met. In this regard, HMG agreed that MOIC would provide NTA with blanket approval to change the VDCs on the list by end October 2004.²¹

The unauthorised entry of NTC into the exclusive areas earmarked for STM was a clear violation of the licence condition. However, even after numerous complaints from STM and reminders from the World Bank to stick to the agreed rules of the game, NTA failed to stop this continuing gross abuse. Therefore, from the perspective of ensuring a favourable TRE in terms of market access and regulation of anti-competitive practices for the smooth implementation of the RTS in Nepal, it is evident that NTA has clearly failed in its duties. This no doubt has created several problems for STM in terms of profitably engaging in its business, especially since the VDCs where these violations have taken place are not economically capable of sustaining more than one operator.

Adding to already complex issues is the matter of the CDMA license issued to NTC. The incumbent is planning to install one million lines over the next five years across Nepal including the EDR. Technical experts are of the view that the CDMA signal will cover almost all VDCs in the Tarai region and many of the hills region VDCs which would result in telephone services at a much lower tariff than the existing STM tariffs.²² Be that as it may, the general view is that the CDMA roll-out has been talked about for a number of years without any activity on the ground.²³ If and when the CDMA roll-out takes place the challenge for STM to operate their VSAT PCOs will become much more difficult.

6.1.2 Technology and network roll-out requirements

The RFA was technology-neutral to the extent that it allowed applicants to choose “any appropriate wireless or wire-line technologies in the provision of the RTS services.” In terms of network roll-out, the RFA gave STM freedom to prioritise the VDCs in a manner that was most suitable to them. The RFA simply mentioned that 50% of the VDCs were to be covered within nine months and completed within 18 months. NTA and the World Bank did not require any order in which the VDCs or districts should be covered.

The outcome of the above two conditions was that STM proposed a VSAT solution, upon which it was selected as the lowest subsidy bidder and began roll-out with the easiest, or most accessible VDCs at the beginning, leaving the difficult ones for later.²⁴ This logic is quite straightforward and falls well within the rules of the game.

It must be noted here that STM is a large VSAT manufacturer based in the US. At the time STM applied for the smart subsidy, it had wide experience in manufacturing and installing VSAT networks. It had supplied and installed equipment in Bolivia, Argentina, Venezuela, Mexico, Brazil and Thailand as well as to the incumbent operator in Nepal.²⁵

In terms of implementation and sustainability difficulties encountered by STM, several questions have been raised by the many stakeholders of the project.

One is whether STM selected the best technology solution. Our research revealed that there is more than one answer to this question depending on the respondent. As far as ease of installation and quick deployment is concerned, VSAT technology appears to have been the most suitable technology in the extremely difficult to access mountainous areas of EDR, and perhaps even for some of the more difficult to access areas in the hills where transportation is an immense hurdle. This is borne out in the fact that in just over a year STM completed the installation and commissioned RTS in 542 sites in 271 VDCs. These installations, however, were concentrated in ten out of the 16 districts in the Tarai and hills region while the remaining six remote districts were not touched. STM is of the view that had there been smooth operation of the project they would have completed their obligation of installing and operating all 1,068 PCOs in all the 534 VDCs in due time.

The problem, however, is that given the slowing down of the roll-out due to a variety of reasons, most of them beyond the control of STM, STM is unable to maintain the network on a profitable basis. In this circumstance, the issue is whether using an integrated solution, with a less expensive technology in the Tarai or flat lands and a VSAT solution in the more difficult hilly and mountainous districts, would have been better.²⁶

STM is adamant that prior to proposing VSAT technology they studied in detail the existing infrastructure, geo-demographic and socio-economic conditions of the EDR and concluded that a pure VSAT solution was much more economical than an integrated solution. Interviews with STM indicated that they would have needed to submit a subsidy amount of twice of what its actual winning amount was; i.e. a bid of approximately USD 24 million. The logic was that the EDR was not large enough to economically sustain a solution that had more than one technology.

However, there are other views. These become relevant in context of the practical problems STM is facing on the ground. For instance, when 345 locations out of 542 are not in commission, a possible solution to sustain operations would be to expand service within profitable VDCs by adding more PCOs in

those areas. But our research revealed that the VSAT equipment used by STM can only serve an area of four to five kilometres with additional VSAT terminals needed for new locations beyond this perimeter. Given the average cost of at least USD 11,000 per VSAT terminal (obtained by simply dividing the USD 11.87 million subsidy by 1,068 locations) the expert view is that it is uneconomical to use this technology to expand within the VDC without any subsidy. The irony is that while STM is losing money because many of their PCOs have been closed down in unsafe areas, they are unable to expand the service within the safe areas due to high per line costs.²⁷ Had STM used an integrated WLL and VSAT technology it might have had a greater chance of reducing the project cost and opportunity to expand within safe VDCs.²⁸

If the objective of giving absolute freedom in the choice of technology was to motivate the licensee to use either one type of technology or a combination of best possible technologies to make the project the least expensive in capital layout as well as recurrent maintenance and operational costs, then the evidence does not suggest the outcome was optimal.

In terms of coverage, perhaps if some priority areas had been indicated, not necessarily in terms of particular VDCs, but in terms of difficulty of access or districts within the EDR, it might have been possible to achieve a more balanced roll-out.

Another criticism levelled at the design of the RTS and thus the technological solutions proposed by the bidders is whether sufficient information on EDR along with any demand forecasts were provided to potential bidders by NTA. The argument is that if such were available, bidders would be more prudent in proposing appropriate technology. NTA and the World Bank take the position that the input from their rural economic consultants (not those who helped design the RTS) based upon extensive groundwork and the feedback on the draft RFA provided sufficient information for bidders to formulate their plans. Even though the tender did not require a business plan to be submitted for evaluation along with the LCS amount, it is obvious that a business plan had to be prepared to arrive at this subsidy amount. The question is whether the assumptions in these plans were accurate in the absence of relevant information.

	Nepal Telecom			STM Telecom Sanchar				Per capita income (USD)	Total phones in VDC
	Allotted	Installed	% of NT share	Allotted	% of STM share	Installed	% Installed		
Mountains	47	54	42.4	70	57.6	0	0	237.7	54
Hills Region	139	173	37.0	256	63.0	162	63.3	195.5	335
Terai Region	173	235	52.8	208	47.2	109	52.4	224.4	344
	359	462	44.1	534	55.9	271		240.0	733

Source: NTA and other local sources.

It is interesting to note that NTA revealed that they did not undertake any survey to estimate potential demand for RTS in the EDR prior to preparing the RFA and bidders may have over estimated revenue, thereby influencing the decision for more expensive technology.

6.2 Scope of service

6.2.1 Mandatory services

STM was required by licence conditions to provide basic public telephone service consisting of local, domestic long distance (STD) and international long distance (ISD). Free access to emergency dialling, directory assistance and a consumer complaint centre were also deemed as mandatory services.

For payments to be made to STM for meeting milestones, an independent technical consultant, Canadian based PlanetWorks Consultants, had to certify that incoming and outgoing local, STD and ISD calls could be obtained from STM's PCO locations. At the time of authorising payments these certifications were duly obtained.

However, our research indicates that there are ongoing complaints about it not always being possible to complete a call between STM and NTC, indicating technical interconnection issues. The World Bank mission in October 2004 underlined this issue in noting that the mission was unable to call the STM network from NTC's mobile network. The mission recommended that NTA take immediate action to address these problems.

PlanetWorks also identified a number of interconnection problems that STM was facing. Having deliberated this unsatisfactory state of affairs with the World Bank, NTA agreed to take several steps to correct the situation. It agreed to hold regular meetings with STM and NTC to ensure resolution of technical interconnection issues in a timely manner, and to identify free-of-charge emergency numbers to be allocated to STM for programming into its facilities to meet its mandatory obligation for free emergency dialling.

More than a year since these agreements were entered into, the incumbent NTC has continued to muscle its way through disregarding commitments made to NTA and the World Bank. NTA has been unable to satisfactorily mediate between NTC and STM to solve these issues. From the perspective of creating a TRE that is conducive for the success of STM's operations in Nepal, it is clear that NTA has failed in its duties to ensure a favourable interconnection regime, at least from a technical standpoint, and once again failed to end continuing anti-competitive practices by the incumbent.²⁹

6.2.2 Additional services

In many backward VDCs on the list of 534, economic activity is sufficiently low to not venture beyond providing more than the mandated two PCOs. However, there are a number of VDCs where it is economically feasible to offer many more than two PCO connections and other value-added services such as Internet and email access, data communication and fax services, etc. In addition, evidence suggests that there are many

VDCs that are not on the STM list that could be served with one or many lines.

In a positive move to relax the rather stringent licence condition of restricting service provision outside of the identified 534 VDCs, the World Bank in October 2004 recommended that NTA, in consultation with STM, amend sections of the licence to allow STM to provide optional services to meet new demand outside of the listed VDCs. The World Bank clarified that this should be done with the understanding that it would not affect the meeting of roll-out milestones; and that no subsidy would be paid for the provision of extra services.

However, STM appears to have not shown much interest in providing either more than the two mandatory lines or additional services in any significant number of VDCs either on the list or beyond. It is possible that part of the reason for this is the VSAT technology they deployed, for which adding terminals is expensive and without subsidies it is unlikely that STM is convinced of sustaining more lines.

On the other hand, given that provision of value-added services within the existing PCOs incurs only a nominal marginal cost, with no licence fees, STM should consider re-evaluating its policy of supplying the bare minimum to meet the payment milestones, particularly in the current context.

Evidence from Latin America is clear in that the extension of services beyond the mandated minimum and provision of value-added services contributed positively to the success of those projects.

6.2.3 ISD licence

Another serious issue concerns STM's ISD licence. By licence condition, STM was restricted to using the NTC international gateway and other NTC international traffic carriage facilities until 1 January 2004. Thereafter, upon application, STM was to have the right to obtain a national licence to provide ISD services using its own international gateway upon payment of the licence fee payable in the same amount as NTC. According to STM, it has not been granted the ISD licence since its application in April 2004, which if granted would have helped them tide over the serious sustainability issues that have emerged due to the unstable security situation within Nepal.

There is enough evidence to show that the World Bank on numerous occasions requested that NTA comply with the licence condition of providing STM with an ISD licence. STM, during discussions with the authors of this chapter, complained that their requests have not been entertained, while NTA mentioned that it was a matter of STM not making the required fee payments. STM on the other hand was requesting relief in terms of an extended payment plan for the licence fee in light of the deteriorating security situation taking a tremendous toll on its bottom line.

It was the responsibility of the NTA to be more proactive in this situation and make necessary mid-course corrections if it wanted to find an answer to the problem. But it appears that NTA was only interested in sticking to the rules, notwithstanding the outcome.

6.2.4 Service quality and service availability

Besides standard quality criteria, STM was also bound by a number of service availability criteria. The key availability criteria was that each PCO be open and available for local, STD and ISD calls during reasonable daytime and afternoon hours, totalling a minimum of eight hours, every day of the week. Where a PCO did not have access to the electrical power grid, STM had to provide an alternate source of power for the PCO. However, this alternate source of power need only be sufficient to provide a minimum of four hours total of actual calling services within the eight hours of daily operation.

The monitoring of service quality and service availability is something that our research found to be wanting. STM is required to provide monthly reports and PlanetWorks quarterly reports. PlanetWorks consultants noted the difficulty of fulfilling the requirements due particularly to security issues and the remoteness of sites. The World Bank has underlined that even under difficulty, these reports are required to be submitted on time.

During our field visit to one of the sites at Bhaudaha in the Morang district, STM's PCO was closed. We were informed that this was because it was a government holiday. Interviews with the local people revealed that the service quality and maintenance were not at all satisfactory. Call charges were much higher than in the nearby VDC where NTC was operating a PCO. Local people were of the view that the STM PCO should be open from early morning hours because that is when people set out to reach their work places, which are usually far from their homes. However, the PCO opens only from 10:00 to 17:00 hours which neither serves their purpose, nor the licence condition that the PCO be open for a minimum period of eight hours per day on all days of the week. In the case of the above example, the PCO is run by the VDC, a semi-government office which opens only during office hours. It would have been much better had the PCO operated from a private house or business where it would have been much more easily accessible to the villagers outside of office hours.

Discussions with PlanetWorks indicated a number of technical issues that needed to be resolved to make service quality monitoring more efficient. Amongst the recommendations were that NTA purchase a GIS-based system to assist in mapping VDC sites, store data and undertake analysis. This request had also been reiterated by the World Bank on more than one occasion.

Another relevant point is whether STM was prudent in the selection of partners to operate their PCOs, in terms of the right incentive structure to keep to the service quality and availability criteria. Our research indicates that the partner selection process could have been done in a way that would have generated better results. It appears that the normal practice is for a representative of STM to visit a village, shortlist a few potential candidates and subsequently select a person to operate the PCO – all on the same day. It was also revealed that for a person to obtain the right to operate a PCO, STM required them to deposit NPR 35,000, which would be refunded in three

years (with a forfeit of NPR 15,000 if discontinued in one year, NPR 10,000 forfeited if discontinued after two years, etc.). Once the right to operate a PCO was obtained, the applicants had to make advance payments (prepaid cards) of NPR 7,500 through banks, which in some cases are two or three days' walk from the VDC. Discussions revealed that many of these PCO operators were in dire financial difficulty due to the fact that the PCOs were either non-operational or provided a very meagre income.

6.2.5 Interconnection and tariffs

The literature is replete with the point that interconnection has a very significant impact on new entry which puts tremendous pressure on the regulator to establish clear and fair interconnection rules for new entrants, particularly new rural operators. Because of significant externalities generated from incoming traffic towards rural networks, as well as different incremental operating costs between urban and rural networks, well thoughtout cost-based interconnection is essential. The literature has built a case for asymmetric or skewed interconnection agreements favouring the rural operator in order for operators like STM to succeed.

However, NTA has failed on crucial issues related to interconnection and tariff regulation and thereby created a TRE that is uncondusive to the continued implementation of the project, let alone its sustainability.

The process of interconnection between the eventual licensee's network and that of NTC was to be governed by the Telecom Act's Guidelines for Interconnection. However, as described above, the RFA did not specify an interconnection charge between the eventual RTS licensee and NTC, but indicated a maximum retail tariff of NPR 9.00 per minute for local calls in the RFA annex on maximum tariffs and default interconnection rates.

An interconnection charge, prior to actual award of the licence to STM, was eventually agreed upon between STM and NTC as 55% of NTC's own VSAT tariff. With the NTC VSAT tariff set at NPR 9.00 per minute the interconnection rate between STM and NTC was then set at NPR 4.95 per minute for calls originating on the STM network and terminating on the NTC network. STM therefore set its own tariff at the maximum allowable rate of NPR 9.00 per minute. Calls originating on NTC's network and terminating on the STM licensee's network were to receive NPR 0.30 paid by NTC to STM.

To facilitate routing and charging for these agreed upon rates, NTA allocated to STM a separate numbering range with a 99-3 prefix.

When STM actually started rolling out, the reality was that a local call originating and terminating on its own network or terminating on NTC cost NPR 9.00 per minute. This was in contrast to NPR 1.00 for two minutes for NTC to NTC non-VSAT calls, making an STM call 18 times more expensive than a call on NTC (note that NTC had VSAT phones in only seven of the 464 VDCs it covered in the EDR). Having realised that it was not at all possible to sustain such high tariffs, STM eventually

reduced its local tariff to NPR 3.00 per minute at a loss of NPR 1.95 per minute (still six times NTC rates) and reduced STD to NPR 5.00 per minute with an operational profit of only NPR 0.25 per minute.

After numerous rounds of lobbying and directives by NTA under pressure from the World Bank, NTC finally reduced the interconnection rate charged to STM to NPR 2.75 per minute for calls originating on STM and terminating on NTC and continued paying NPR 0.30 per minute for calls originating on NTC and terminating on STM.

The original interconnection charge was, to put it mildly, extremely high. This obviously led to the NPR 9.00 tariff that was not sustainable and had to be brought down to a loss-making tariff as noted above. In addition, STM reported serious congestion on the lines and this fact has even been reported by a World Bank mission unable to complete calls from NTC to STM.

Internal communications indicate that the interconnection issue was brewing from the word go. STM had requested NTA to facilitate the interconnection agreement with NTC – and received a positive reply on this. NTC insisted that they could interconnect STM along the same lines as UTL (the fixed WLL operator), which meant STM paying for 16 E1 lines despite the requirement being for a single E1 line. Furthermore, NTC had objected to providing interconnection at two locations (Kathmandu and Biratnagar) even though the licence condition had provided this facility to STM, which was anyway a key criterion for reducing their backhaul costs to make the operation sustainable. In an early letter to the World Bank, STM identified this issue as a show-stopper and requested the World Bank to help sort out this issue.

The independent certification consultant had identified a number of interconnection problems that STM was facing. Based on discussions between NTA, STM and NTC, the regulator had agreed that NTA would immediately mediate between STM and NTC to negotiate a fairer interconnection and revenue sharing agreement, and hold regular meetings with STM and NTC to ensure resolution of technical interconnection issues in a timely manner. It was further agreed that services of a consultant be used to assist NTA develop an interconnection, pricing and tariff regime to resolve problems faced by STM and NTC. But, things dragged on.

A decision that warrants some attention is why NTA and the consultants to the World Bank agreed to the maximum rates proposed in the RFA (NPR 9.00 per minute) as reasonable.³⁰ The consultants had noted that since neither they nor NTA had NTC's actual costs and interconnection rates, the proposed tariffs had been "benchmarked adequately and should provide some comfort to potential applicants." However, they observed that the problem was going to arise with NTC's reaction to interconnection. To deal with this impending issue, they suggested that NTA be provided with "convincing arguments to support the proposed tariff levels."

From a TRE point of view, it is clear that NTA had been unable or unwilling to stop NTC from imposing unfair and

potentially detrimental interconnection charges on STM. This resulted in a negligible volume of calls being originated on the STM network and a minimal termination of local calls to the network. Even after the reduction in call rates (but still six times that of NTC) it was reported by STM that during July-August 2005, the average daily use across the 174 operational sites was only 0.36 minutes per day.

Given that problems faced by STM were multiplying due to the deteriorating security situation and with the viability of the entire project hanging in the balance, NTA must take a fair share of responsibility for dragging on the interconnection and tariff issue for such a length of time without finding a reasonable solution.

Subsequent to research for this chapter being completed, NTA reported that on 18 October 2005, it issued a directive to operators on the new interconnection rates. This new regime has a number of very positive features for reducing the burden on STM. The salient features of the new guidelines are that all local calls will be on a 'sender keeps all' basis, instead of the unacceptable interconnection charge previously imposed on STM by the incumbent; calls within the EDR will attract identical interconnection charges between NPR 0.60 and NPR 3.15 per minute depending on whether the call is handed over at the 'near end' or 'distant end' and also whether the distance is less or more than 50 kilometres; and calls between the EDR and other regions of Nepal will attract a much higher interconnection charge on STM than on NTC.

The gist of the new interconnection rules are:

1. Sender keeps all for all local calls. This is a dramatic change from the previous arrangement of STM paying NTC NPR 2.75 per minute. Under the new regime neither STM nor NTC need to pay anything to the other party for terminating calls on the same charging zone or district.
2. Identical interconnection charges for calls between districts but within the EDR and 'distant-end handover'. Here STM gets NPR 1.0 per minute from NTC for terminating a call if the STM customer is not in the same district as the NTC customer but within 50 kilometres. The amount increases to NPR 3.15 if the distance is over 50 kilometres. However, if the termination is on a 'near-end handover' basis the amount drops to NPR 0.60 for both parties.

For calls between the EDR and other regions of Nepal, the structure is different and not much help to STM. In this case, if an NTC call from any other region besides EDR is terminated on STM's network in EDR, STM gets NPR 0.60 per minute, but if it is the other way around, that is, an STM call is terminated on the NTC network outside the EDR, STM has to pay either NPR 1.00 or NPR 3.15 per minute depending on the 50 kilometre rule. This interconnection regime is further explained in Annex 5.

While this change in the one-sided interconnection regime that was detrimental to STM is welcome, the real question is how well this ruling will be implemented.

6.2.6 Why not an asymmetric interconnection agreement?

The real question is why did the NTA and the World Bank not pursue a cost-based asymmetric interconnection agreement favouring the RTS operator? This issue is not addressed even in the revised rules just published.

The Latin American evidence is clear that it is only through such an interconnection agreement that a significantly high incoming revenue structure for rural networks has been made possible, thereby making them sustainable. The key is that the rural operator must be adequately compensated for the high operating costs and low revenue yield through such innovative mechanisms.

6.3 Telecommunications Regulatory Environment: NTA

The foregoing discussion clearly indicates that while certain improvements in the design and a more conducive security environment would have helped STM keep to the implementation plan, the primary reason for current complexities threatening completion of implementation and sustenance of the program is the weak TRE in which the incumbent NTC is violating numerous agreements with impunity.

The weaknesses in NTA were not unknown. All stakeholders were aware of the capacity issues NTA was facing prior to going ahead with the RTS. In this context, the World Bank had, in 2004, held extensive discussions on the performance of NTA in a multi-operator environment and recommended that NTA institute processes to improve its regulatory functions. In this regard, NTA had agreed that a performance audit would be undertaken in order to assess its performance and identify key bottlenecks hampering its performance. The audit was to provide important recommendations, and their implementation would help the institutional strengthening and functioning of NTA. The World Bank proposed a specialised training and capacity building program for NTA staff to address the "enormous need to build capacity within NTA." In the interim, discussions also highlighted the need for NTA to hire individual consultants to serve as short-term regulatory advisors to address immediate and important issues.

However, even by late 2005 the situation at NTA remained essentially the same, with a serious lack of capacity. Interviews with the chairman and senior officers revealed that NTA was severely understaffed and ill equipped for proper functioning. The regulator's capacity to make decisions free from the influence of MOIC,³¹ revise staff remuneration to attract suitable people for the unenviable job of dealing with the powerful incumbent and even the relatively easy task of filling the senior and middle management positions remaining vacant have not happened. Even the fifth member of the NTA board was only appointed in August 2005 – without whom obtaining a quorum for meetings was difficult, leading to delays in the decision-making process.

With this background, it is not surprising that the TRE in Nepal with respect to the five dimensions of market access, access to scarce resources, interconnection, tariff regulation and regulation of anti-competitive practices continues to be

weak. Without a doubt this situation is clearly jeopardising the entire RTS project in the EDR.

7. Sustainability

With the incentives offered to the licensee in terms of the subsidy, low licence renewal and frequency fees, and exemption from RTDF fees for five years, along with the authority to operate domestic long distance and international long distance services, the operation of the RTS project in the Eastern Development Region of Nepal should be theoretically sustainable. The overall sustainability of the project is dependent upon a number of factors; but the bottom line is that the operation has to be viable in at least the medium term. While it is true that some of the problems threatening sustainability of the RTS are extraneous to the project per se, and were also unexpected at the time the project was conceived and implemented, there are others that could have been handled differently. There are a number of steps that NTA and STM could take even now to alter the current direction of the project.

7.1 Politico-security climate

As discussed at length in earlier sections, the combined politico-security environment within which the rural telecom network (RTN) operator has to operate is overwhelmingly difficult. All PCOs were shut down for a number of months beginning in early 2005, and even towards the end of the year, a majority were still not permitted to enter back into operation. A large number of PCOs may have to be relocated and/or new locations allocated for the remaining obligations. A disturbing trend is that these alternate PCO locations are being unilaterally ordered to be established within a half kilometre of military camps, most of which already have NTC service coverage rendering the higher cost per call of STM service useless.

STM appears to be more interested in installing the equipment it has already imported (lying in customs offices attracting demurrage) and collecting the subsidy rather than considering steps to ensure sustainability of the project.³² However, it is only natural that STM behaves in this manner when their business plan has perhaps become meaningless with such drastic and unexpected changes even before it was able to consolidate in the region.

While the deteriorating security situation in Nepal, which is beyond the control of HMG, NTA and STM, does not augur well for the sustainability or even the full implementation of the RTS project, the only silver lining is that STM is optimistic that once the security situation returns to normal and the licensee starts ISD services in hopefully a more conducive environment, they would still be able to bounce back to a comfortable position.³³

7.2 Regulatory regime

Previous research on similar projects elsewhere in the world have converged in their unambiguous findings that a

favourable telecom regulatory regime is crucial to the successful implementation and sustainability of a smart subsidy program such as the one under discussion here. However, if the politico-security climate is bad in Nepal, then the regulatory regime appears to be even worse.

This is the real challenge for NTA and the World Bank, to make quick and comprehensive changes in the TRE so that the project's downward direction can be turned around.

This chapter has discussed at length in the previous sections numerous regulatory issues that are not favourable for ensuring viability for the project. Key among these is the interconnection regime for which the RTS operator has to pay extremely high interconnection rates to the incumbent to terminate on the incumbent's network. In this context the new interconnection ruling is very positive.

However, the more important issue is the absence of a cost-based asymmetric interconnection regime. The literature is clear in identifying an asymmetric interconnection regime in which the rural operator (STM in this case) is offered a much higher amount than urban operators to reflect the higher cost of operating the service and the lower level of income generated by outgoing calls. The objective is to provide a revenue stream from incoming calls to the RTN.

Unless this interconnection problem is resolved in a more meaningful manner with added incentives for STM in terms of cost-reflective asymmetry, it is highly unlikely that STM will be able to sustain the operation over the longer term. This is borne out by the meagre revenue figures that STM is reporting for its network, particularly under the trying security climate where a majority of its PCO locations have been forced to shut down.

Another issue is the granting of the ISD license to STM, which has been pending for a long period of time. Given that carrying ISD calls on its own gateway appears to be the only short-term revenue generator for STM in the current situation, NTA delaying this action, despite the many requests by the World Bank to expedite the matter, is a blow to the project's sustainability.³⁴

STM was granted five-year exclusivity to operate its network in the identified 542 VDCs in the EDR. However, NTC has continued to violate this exclusivity condition and has moved into areas allocated to STM and provides lower cost calls using cheaper technology and more favourable internal interconnection mechanisms. Unless NTA immediately brings an end to this violation, sustainability of STM's RTN will be seriously challenged.

The licence condition calls for STM's PCO locations to be open daily for eight hours and to provide services at a pre-specified level of quality. However, it is reported that a number of locations provide neither the specified service hours nor the specified quality. While the independent technical consultant provides a quarterly report to the NTA and World Bank on the service quality, the consultant's own view is that it is increasingly difficult to continue the monitoring under the deteriorat-

ing security climate, thus making it difficult to obtain a clear picture of the exact position on the ground.

Yet another looming issue is NTC's ongoing plan to expand its network with CDMA technology. Legally, NTC cannot penetrate in the VDCs where STM has its PCOs, but in practice it will be very difficult, both technically and politically, to stop NTC's CDMA customers from using the service. This would obviously weigh heavily in the sustainability of the RTN.

While these are among the major issues NTA will need to address on an urgent basis, there are a number of other issues that also need to be resolved to ensure sustainability of the RTN project.

7.3 Business plan

NTA and the World Bank did not require a specific business plan from bidders for evaluation, since the selection process was an LCS auction in which only the requested subsidy amount was the deciding factor, as opposed to a beauty contest for which the evaluation panel would have had to consider the various business plans. Whoever requested the lowest bid was to get the subsidy and the licence.

However, when STM bid USD 11.87 million as the required subsidy for the EDR licence it was implicit that they would have calculated the discounted stream of cash flows over the 25-year licence period and arrived at a positive net present value. In preparing the business plan and arriving at the net present value calculation, STM would have made a number of assumptions. The question then is how accurate these assumptions were at the time of their making, and how accurate they are in the present. One of the success factors for similar projects elsewhere had been accurate demand analysis based on comprehensive market research made available to the bidders. In the case of Nepal, such detailed research and analysis does not seem to have been performed.³⁵

It is possible that STM's demand analysis, obviously at the core of its business plan, may be inaccurate. If that is in fact the case, it will be almost impossible to meet the projections necessary to meet the cash flows expected in the business plan without which sustaining the project would become questionable. The operator data indicated that the average use per PCO during August 2005 was less than one minute per day.

The view of NTA and the World Bank is that according to the STM business plan they were aware that STM would be posing losses for the first two years, but these losses would turn to profits thereafter.³⁶

7.4 Technology bias

Another salient feature in Nepal, as well as in some countries where such LCS auctions have been held previously, is the possible conflict arising out of the direct relationship between the operator and rural telecom technology suppliers. There is ample evidence to show that had the technology been cheaper to implement than the VSAT-only solution, it would have possible to expand the services inside the non-conflict areas in the EDR. In preparing the business plan it is likely that creating

the biggest possible market for VSAT equipment would have played a significant role and thus more optimal solutions were overlooked.

The expert opinion, however, was that VSAT technology was the only alternative for the high mountains of the northern border and sustaining those locations would not be difficult with the significant tourist traffic in those areas.³⁷

Even now, it is possible to consider enhancing the technology with an integrated VSAT/WLL solution to serve the new locations being provided to the licensee. The logic is that the new locations may not necessarily be as remote as the ones originally envisaged and the possibility to connect a greater number of locations (homes, businesses) would be possible with such an integrated technology.³⁸

7.5 Management issues

The literature refers to the ability of the licensee having a proper marketing structure to effectively expand the number of connections beyond the obligated PCOs as well as to market additional services, including Internet and other data communications services.

While it appears that STM has a marketing savvy management team, it is not so clear whether their model of selecting franchisees or PCO operators is the most optimal and also whether the incentive structure offered to them – payment of a NPR 35,000 deposit and advance payments of NPR 7,500 – creates sufficient motivation for them to sustain the operation under severe constraints.

This issue is further complicated due to the fact that STM's experience in actually operating telecom services is very limited.

8. Concluding comments

The question postulated at the beginning of the chapter was what conditions had to be met in order to make smart subsidies work to bridge the access gap in telecom services in rural areas. Nepal's Eastern Development Region project was the case under study.

While it is true that the smart subsidy project has been able to provide some rural communities with telecom services they did not have access to prior to the project, the real question is whether the solution is optimal and whether the project could be sustained in the medium to long term. The answer is not straightforward.

The findings throughout the chapter converge on the point that unless the right regulatory conditions are in place, particularly with respect to cost-based asymmetric interconnection agreements and effective regulation of the incumbent's anti-competitive practices, the success of RTS providers who are empowered by smart subsidies, will be threatened. In other words, the findings suggest that the smart subsidy project in the Eastern Development Region of Nepal may fail unless the prevailing regulatory framework of the Nepal Telecommunica-

tions Authority is made more conducive for STM Telecom Sanchar, the RTS operator.

This conclusion leads to revisiting the wisdom of separating the access gap and the market efficiency gap in the literature, particularly in terms of sequencing smart subsidy projects and market liberalisation programs. The findings indicate that perhaps it would be more useful to consider addressing rural connectivity issues from an integrated and continuous regulatory subsidy angle instead of separate solutions for the discrete two-gap problem.

Besides the crucial conclusion that smart subsidy projects could fail without a favourable telecom regulatory environment, another important conclusion is that such projects should have built-in mechanisms for dynamic mid-course corrections.

The case of Nepal highlights this point very well, with unexpected security problems having caused havoc in the implementation and sustainability of the already weak project, threatening the very existence of the smart subsidy initiative.

Recent action by NTA, at the strong insistence of the World Bank, particularly with the new interconnection ruling and the awarding of the ISD licence, are perhaps the most positive steps taken to change the downward direction of the project thus far. It is hoped that such action will be commended and the NTA encouraged to continue its good work towards creating a more favourable TRE, which would ultimately decide the fate of this USD 11.87 million project to provide telecommunication services to the rural population of the Eastern Development Region of Nepal.

Notes

¹ The conceptual framework of the two-gap dichotomy is developed in Navas-Sabater et al. (2003). There are others who refer to the same dichotomy in terms of a 'regulatory gap' and an 'affordability gap'.

² Although India has completed a number of LCS auctions for operators with existing licences, it was Nepal that first actually used an LCS auction to provide a licence for a new operator to enter the market.

³ USAID provided USD 1.7 million.

⁴ Since 1991, and the beginning of the multiparty system, representatives in Parliament from remote areas began demanding telecom facilities in their constituencies. Since it was not possible to install fixed line telephone sets in those isolated communities, wireless telephone sets using VHF/UHF technology was the most economical and quick fix to meet the growing demand. From that time until 2001, many VHF/UHF telephone sets were installed. NTC started to use VSAT technology on a large scale only after 2001 (Source: NTA).

⁵ See: <<http://www.nta.gov.np/index.html>>.

⁶ The fifth member was finally appointed at the strong insistence of the World Bank. In fact, for a very long time, it had only three members including the Chairman.

⁷ See Samarajiva and Zainudeen (2005).

⁸ Dividing the country into three regions based on terrain – mountains, hills and terai – was also considered. The key advantage would have been the possibility to use different technologies in the three geographically different regions. However, that was abandoned in favor of the administrative regions.

⁹ The consultants to the World Bank were from the Canadian consultancy firm, McCarthy Tetrault Inc.

¹⁰ NTC's STD licence fee for ten years was NPR 35,000,000 (approximately USD 437,500).

¹¹ NTC's ISD licence fee for ten years was NPR 62,500,000 (approximately USD 781,250).

¹² NTC's VSAT tariff is an internal rate set by itself for its own VSAT network, which constituted just seven of the 1,711 VDCs it covered in all of Nepal.

¹³ The Telecommunication Policy 1999 states that NTC shall complete the phased rebalancing of the tariff by the end of 2004. It further states that after the completion of the rebalancing, a price cap policy should be applied. NTC, thus far, has not rebalanced its tariff and the NTA is still studying the introduction of a price cap regime.

¹⁴ The RFA was not clear on how the selection would be made in the event of there being more than one identical lowest bid.

¹⁵ A somewhat revised plan was actually implemented, discussed further in the chapter.

¹⁶ Aide memoire of supervision mission, January 2003; pre-bid conference, April 2003.

¹⁷ TCIL from India.

¹⁸ In some of the Latin American projects, incumbents were allowed to bid, but did not necessarily win the LCS auctions. However, in India the incumbent won the majority of LCS auctions, the reasons for which have been discussed earlier in the chapter.

¹⁹ Not only STM, but rather all telecom facilities were completely interrupted for seven days. Internet services were also shut down for seven days. Mobile phone operations were suspended for three months and even then only select post-paid connections were reconnected. Prepaid connections were activated only after five months. At the time of our research, private FM radio stations were prevented from airing news and newspapers were prohibited from publishing news deemed to be anti-state or reporting anything about the Maoist insurgency.

²⁰ Internal World Bank documents.

²¹ This blanket approval was granted to NTA by MOIC to ensure their responsiveness.

²² STM tariff structure is discussed later in the paper.

²³ NTC claims it is ready to commence the service. The commissioning of the service and the installation activities were stopped by a court order. Speculation is that the court ruling will be delivered in February 2006.

²⁴ The STM license was granted 21 November 2003, roll-out of 50% of VDCs completed by 14 January 2005.

²⁵ STM Telecom Sanchar Inc. is a consortium consisting of (a) STM Communication Services Inc., US, (b) STM Network Inc., US, (c) SAMART Communication Service Co. Ltd., Thailand, and (d) Apollo Investment Private Limited, Nepal.

²⁶ See Annex 4 for a summary of technology cost guidelines.

²⁷ RTS in the EDR called for installation of 1,068 PCOs in 534 VDCs spread over 28,456 sq. km. Not all VDCs are in remote and inaccessible areas. In fact 416 PCO locations i.e., 39% of RTS areas are in the flat land or Terai region. By way of contrast, NTC's technology distribution in EDR is follows: wire-line 102; radio and wire-line 108; VHF 245; VSAT 7 – for a total of 464 VDCs covered.

²⁸ This is a rough estimate made available to us by local experts and presented here as relevant information. However, the authors do not take responsibility for the accuracy of same. All 416 locations in the Terai region can be easily covered by WLL technology. Even if only 10% of the remaining stations, i.e. 65 stations, are covered using WLL technology, locations with an integrated technology would result as follows. Using the per line cost of USD 11,110 per VSAT terminal from the ongoing project and assuming a cost of USD 600 per line using WLL technology, the project cost could have come down to USD 6,810,170 which is USD 5,054,830 less than the actual subsidy awarded. If exchange cost is included this cost goes up by another USD 250,000.

Cost scenario with integrated WLL-VSAT technology, amounts in USD

Total no. of stations	Stations using WLL	Stations using VSAT	Unit cost per station using WLL	Unit cost per station using VSAT	Total cost with WLL stations	Total cost with WLL stations	Overall cost
1,068	481	587	600	11,11	288,6	6,521,570	6,810,170

²⁹ A detailed discussion on interconnection pricing is covered further below.

³⁰ Internal World Bank documents.

³¹ The NTC Chairman is also the Secretary to the MOIC. This is a clear conflict of interest.

³² In the latest discussions with the NTA and the World Bank in late 2005, STM has been given the authority to install a minimum of two to a maxi-

mum of eight PCOs in the new list of VDCs. Whether eight PCOs can be sustained in a VDC is a serious question.

³³ Discussions with the General Manager of STM.

³⁴ The World Bank has confirmed that NTA finally issued an IDD licence to STM in November 2005 for a payment (terms not available) of USD 750,000, similar to NTC and UTL.

³⁵ However, the World Bank had engaged its own consultants to undertake background work in the area.

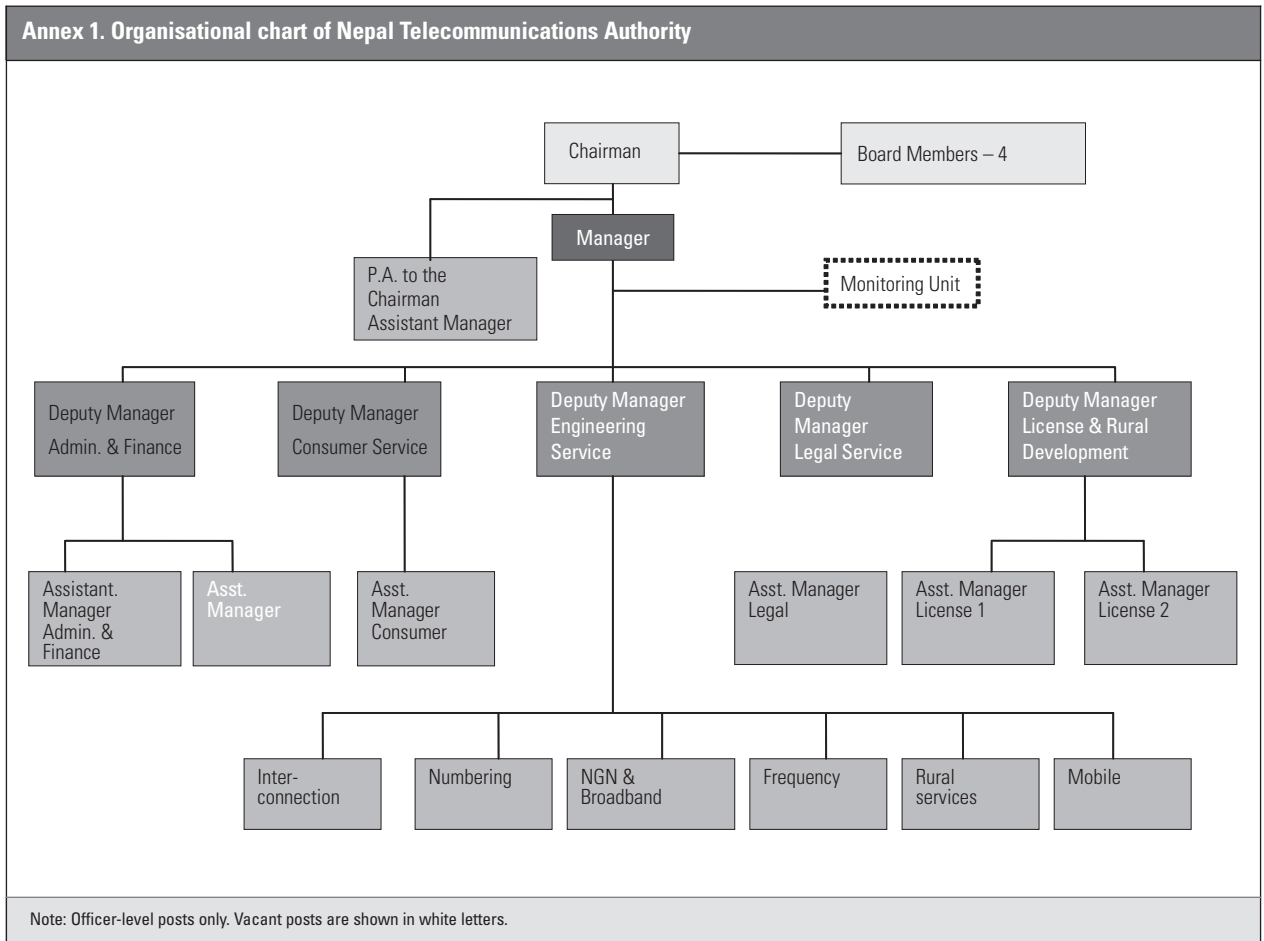
³⁶ This is in contrast to the VSAT operations of NTC. According to discussions with the head of the Rural Telecommunication Directorate of NTC, they have installed 378 locations using 160 VSAT terminals with an average revenue per station per month (based on the study of nine months in 2005) of NPR 21,000, many times higher than that of STM and that of NTC's national average (Financial Year 2003/04) of NPR 1,000. It must be noted that some of these VSAT terminals have been installed to substitute for city exchanges that have been damaged by the Maoist insurgents.

³⁷ However, STM's VSAT operates on the Ku band and the quality of the signal during the rainy season in these areas (due to the technical difficulties of operating Ku band in the rain) is yet to be evaluated.

³⁸ See Annex 4 for details on technology.

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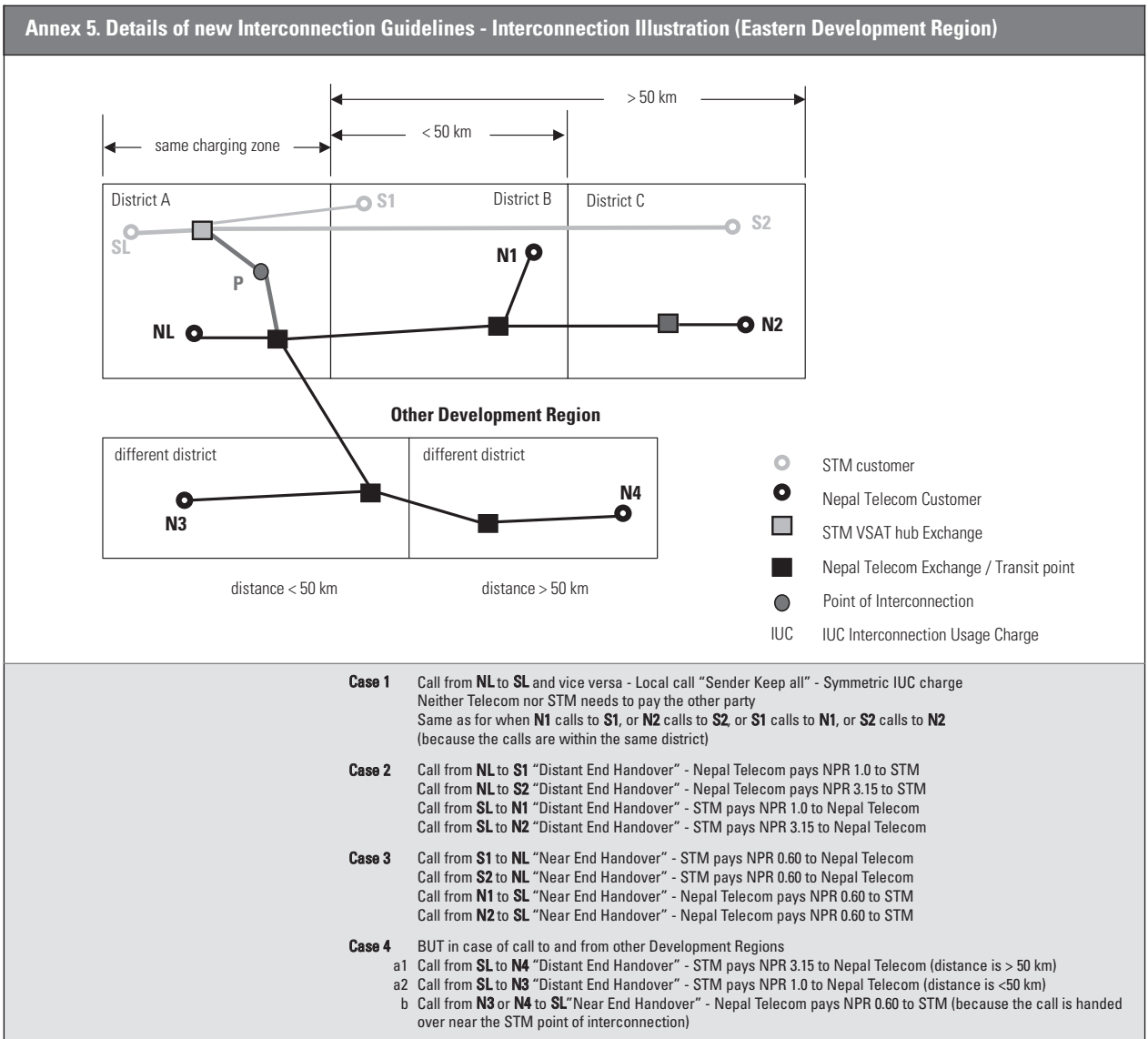


Annex 2. Minimum service quality criteria

Description of Criteria	On Date of Activation	During the Term of Licence
Call Completion Rates		
- Local (on licensee's network only)	92.0%	95.0%
- Local (also using NTC or other network)	96.0%	97.5%
- Long distance (on licensee's network only)	85.0%	90.0%
- Long distance (also using NTC or other network)	92.5%	95.0%
Fault Rate per RTS line per annum		50
Fault Clearance Rates		
- Less than 48 hours		60%
- Less than 5 calendar days		85%
- Less than 30 calendar days		99%

Annex 3. RTS maximum tariffs and default interconnection rates					
Rural Telecoms Service (RTS)	Intra RTS Call originated & terminated on RTS system	Outbound STD Call originated on RTS and terminated on NTC ²	Outbound ISD Call originated on RTS and transited by NTC ²	Inbound STD or ISD Call originated on NTC or other network, terminated on RTS	ISD originated on RTS system after Jan. 1, 2004 – and not inter-connected with NTC
Basic RTS Consumer Tariff ^{1,4}	9.0 NPR (USD 0.117)	9.0 NPR (USD 0.117)	Prevailing NTC ISD Rates, including surcharge rates (e.g. 30/60 NPR per minute) as per the NTC Tariff (see Annex 13 to RFA for RTS)	0 (zero)	Maximum prevailing NTC ISD tariff
Supplementary RTS Consumer Tariff ⁴	0 (zero)	Equal to the corresponding NTC STD termination charge as per G.I. ⁵		0 (zero)	Maximum NTC surcharge rates
Interconnection (termination) charge payable by RTS to NTC ²	N/A	The corresponding NTC STD termination charge as per G.I. ⁵	NTC's prevailing ISD tariff minus 25% of the collection rate as per Cl. 9.4.3(a) of the G.I.	N/A	N/A
Interconnection (termination) charge payable to RTS ³	N/A	N/A	N/A	Same as interconnection (termination) charges payable to NTC (under GI or future rules).	N/A
Notes:			Source: Annex 17 to Request for Applications for RTS.		
¹ All tariffs are in rates per minute, unless otherwise indicated.					
² Paid to NTC or other operator, unless different rate is mutually agreed.					
³ Payable by NTC or other operator, unless different rate is mutually agreed.					
⁴ Tariffs to be subject to price cap indexing after 2004 in accordance with Tariff Guidelines.					
⁵ Termination charges prescribed in Guidelines on Interconnection.					
N/A means 'Not Applicable'					

Annex 4. Technology cost guidelines			
Technology	Density/ Application	Geography/ Distance from telephone exchange	Cost range per line including accessories in USD
Cable direct from urban switch	High and clustered (suburban communities)	Max 5 to 10 km radius	250 - 1,000
Rural exchange or concentrator with wire network	Low/medium and clustered (small town or large village with good affordability)	As above, may serve clusters (e.g., 100 subscribers) located more than 10 km from nearest exchange	1,000 - 2,000 including trunk system and building
Fixed cellular and wireless	Medium/high not clustered	Medium area (<30 km radius per cell)	500 - 1,500 heavily dependent on users per cell
Multi-access radio	Low but clustered (e.g., more than 5 users per location)	Wide area (radius of several hundred km)	1,000 - 5,000 varies widely with terrain and clustering
VHF/UHF single links	Low, no clustering and no satellite alternative	Medium-long distance (> 25km)	10,000+
Satellite VSAT (stand alone)	Low, but most economic with some clustering (e.g., justifying 2-3 lines)	Very large area, long distance (> 200 km)	3,000 - 8,000 plus 0.05 – 0.10/min 'space segment'
Integrated VSAT/WLL	Low, but serving larger distant communities or clusters (typically 10 to 50 lines in vicinity)	Larger area, but economic at shorter distances (e.g., 100 km)	1,500 - 3,000 plus 0.05 – 0.10/min 'space segment'
Mobile satellite (MSAT and LEOs)	Low, with no clustering	Very large area and long distances	\$1,000 - \$3,000 plus \$0.50/min 'space segment')
Source: Navas-Sabater et al. (2003).			



Annex 6. List of persons met

Nepal Telecommunications Authority

1. Mr. Suresh Kumar Pudasaini, Chairman
2. Mr. Kumar Prasad Sharma, Deputy Manager, Customer Services
3. Mr. Ambar Sthapit, Asst. Manager, Technical
4. Mr. Kailash Nath Neupane, Asst. Manager, Legal
5. Mr. Surendra Lal Hada, Asst. Manager, Rural Services
6. Mr. Raghubar Lal Shrestha, Consultant, Planetworks Consulting Corporation (for the World Bank)

Nepal Telecom Corporation

1. Mr. Sugat Ratna Kansakar, Managing Director
2. Mr. Rupak Halder, Deputy Managing Director, Planning and Business
3. Mrs. Laxmi Kanta Shrestha, Director, Rural Services Directorate
4. Mr. Surendra Prasad Thike, Manager Business

STM Telecom Sanchar Pvt. Ltd.

1. Mr. Vijai Vir Singh, General Manager
2. Mr. Sisir Pradhan, Manager
3. Mr. Sunil Jakibanja, Controller
4. Mr. Shiva Prasad Adhikari, Manager, Commercial & Warehouse, Biratnagar
5. Mr. Sudarshan Raj Ghimire, Associate Manager, Technical, Biratnagar

Microtelcos in Latin America and the Caribbean

Hernan Galperin & Bruce Girard¹

1. Introduction

It is no longer adequate to view the provision of information and communication technology (ICT) services as a dichotomy between public utilities and large private operators. In both developed and developing nations, a diversity of organisations (among them cooperatives, municipal governments, universities and local entrepreneurs) participate in the deployment and operation of ICT networks. This is most noticeable in markets unattractive to traditional operators, where a variety of local arrangements exist to service high cost or low income communities. These arrangements are often hybrids of small-scale entrepreneurship, municipal efforts, and community action. What distinguishes them from traditional operators is the local scale, the use of low-cost technologies and innovative business models, and the strong community links. We refer to them as microtelcos.

The problem discussed in this paper is the failure of ICT networks and services to effectively reach the poor, particularly those living in rural areas, in Latin America and the Caribbean. After over a decade of market-driven reforms in the telecom sector, it has become clear that large private operators are no more likely to serve economically unattractive areas with sparse populations or low incomes than the public operators of the past. In many countries in the region, the gap between urban and rural ICT infrastructure has increased since the outset of reforms (see Galperin 2005). Where networks do reach – particularly in the case of mobile telephony – coverage does not mean access since the rural poor are often unable to afford services engineered for wealthier urban customers.

The conventional answer to this problem has been to create incentives for traditional operators to service unattractive

areas and offer public subsidies to cover the difference between tariffs and cost-recovery levels. While these policies have a respectable record in the developed world, the experience in Latin America is at best mixed (Estache et al. 2002). Efficient administration of universal service programs has proven a difficult task for the newly created industry regulators, many of which lack adequate resources (Wallsten and Clarke 2002). Even when these programs are successful, the level of funding limits large-scale replications. It is widely acknowledged that the resources needed to address existing ICT infrastructure needs far outstrip available public subsidies in the region.

This chapter examines a different answer to this problem. We suggest that microtelcos can play an important role in extending ICT coverage in the region, particularly to high cost or low income areas unattractive to large private operators. In fact, we show that a variety of microtelcos are already servicing many of these areas, despite a less than favourable regulatory environment and little access to public subsidies. Their advantage lies in the mobilisation of local resources, such as in-kind labour and private rights-of-way, as well as in the use of new low-cost technologies and innovative business models. Furthermore, much like their close cousins in water, electricity, and sanitation, microtelcos have a development impact that extends beyond the provision of services, for local ownership and management has been consistently found to spur entrepreneurship and nurture social capital (Dongier et al. 2003).

The paper is organised as follows. In the first section we discuss the theoretical case for microtelcos as an effective alternative to address the ICT needs of the poor. Drawing from the work of Ostrom (1996) and others, we argue that there is a large scope for co-production in the delivery of ICT services between municipal government, community-based organisa-

tions (CBOs), and the private sector. Next we discuss how technological innovations are significantly enlarging the scope of action for microtelcos. We then introduce a taxonomy of microtelcos and present examples drawn from across the region. Based on the results of a regional survey of the rules governing deployment of low-cost solutions for local access networks, we argue that an enabling regulatory framework for microtelcos is lacking. We conclude with recommendations for creating such a framework.

2. Co-production of ICT services

Public services can be delivered in a variety of ways. For many decades, most countries relied on large state-owned utilities to provide basic infrastructure services such as electricity, water and telecoms. A major paradigm shift took place during the last decades of the 20th century, paving the way for the privatisation of many public utilities and far-reaching regulatory reforms aimed at opening markets to competition. The shift was particularly marked in the telecom industry, where rapid technological innovation also contributed significantly to undermine monopoly regimes.² It is without question that these changes unleashed an unparalleled wave of innovation and investment in the ICT industries, first in the developed world and later in developing economies. However, after two decades of reforms the limitations of the new paradigm are now becoming clear.

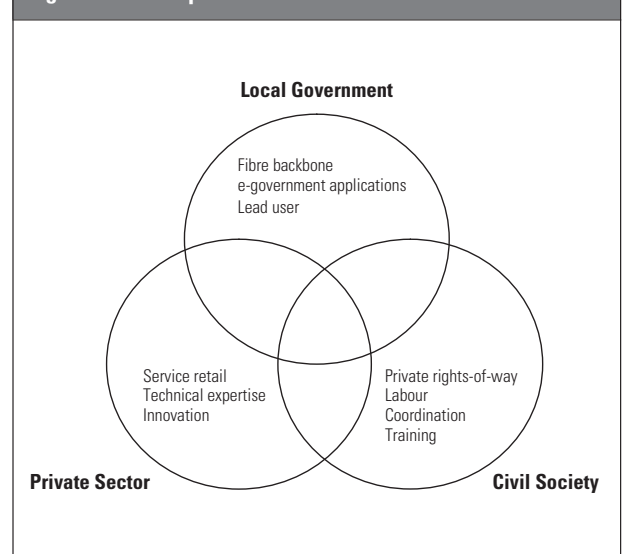
It is widely recognised that large private operators are no more likely to serve high cost or low income customers than were state-owned utilities. This should not be surprising. Ultimately, whether in public or private hands, large utilities face similar challenges in servicing these areas: low or fluctuating incomes, low (and often decreasing) population density, lack of reliable information about customers and their demand preferences (including willingness to pay), lack of credit assessment mechanisms (including a formal addressing system), and lack of complementary infrastructure (such as electricity and roads), among others. Other factors further discourage large private operators from tailoring service to the poor. The shared costs structure of telecom networks means that providing more and better services to the more profitable customers increases the cost of provision to all – even to those requiring less quality at more affordable prices. In many cases, rigid regulations on tariffs and engineering standards further discourage price/quality differentiation. Lastly, the availability of cost-based public subsidies sometimes deters large operators from seeking more efficient alternatives to serve the poor.³

Therefore while large private utilities are well suited to building network backbones and retailing services in wealthy urban areas, their organisational advantages tend to diminish as we approach the last-mile segment in high cost or low income communities. Large utilities lack either the flexibility or the incentives to seek alternative combinations of inputs

better suited to serve poor customers. Microtelcos, by contrast, thrive on creative entrepreneurship. Because their core business is to serve customers unattractive to large operators, they actively seek combinations of capital, labour and technology that maximise returns based on their knowledge of local conditions and demand preferences. This involves deploying low-cost technologies, bundling ICTs with related services (such as training, financial, and legal services), taking advantage of related infrastructure (such as roads and water systems), and finding business models (including payment collection mechanisms) appropriate to local conditions.

A key factor is that not all inputs necessary to optimise last-mile service delivery to the poor can be mobilised efficiently by large private utilities. Labour for infrastructure building and maintenance can often be contributed by customers themselves, often at little opportunity cost given high levels of underemployment in many poor regions. There are abundant examples of community members volunteering to set up towers, string cables, and construct facilities necessary for community network projects. It is also the case that while potential customers in these areas typically lack financial resources, they often control critical rights-of-way for wiring and antenna siting. Condominial lines running through household yards (and thus owned and maintained by customers themselves) have long served to extend urban sanitation networks in Brazil and Bolivia (Watson 1995; Foster and Irusta 2003). This is also how much of rural America was wired for telephony in the early 20th century (Fischer 1992). Today, low-cost wireless technologies are renewing opportunities for end-user deployment and control of the first segment of the network.

Figure 1. The co-production of broadband services



Municipal governments are another important actor in the provision of ICT services in these areas. In Latin America, democratic changes since the 1980s have been accompanied by decentralisation programs aimed at increasing local government autonomy, creating an enabling institutional setting for the delivery of public services at the municipal level. As the examples discussed below reveal, the role played by local governments in microtelco projects in Latin America varies widely (as it does elsewhere). In many cases, provincial authorities have been instrumental in aggregating demand, developing e-government applications, facilitating planning, and providing training to potential users. In other cases, municipalities have co-financed infrastructure investments through a variety of partnerships with private operators. Yet in others, local authorities have engaged in the building and operation of a non-competitive network segment (e.g., a fibre backbone) on a wholesale basis.

Different organisations thus have a comparative advantage in each of the tasks involved in the provision of ICT services to the poor. The concept of co-production captures this well. Co-production refers to the potential complementarities that exist between different organisations in the delivery of a service (Ostrom 1996; Gerrard 2000). Figure 1 illustrates this potential in the delivery of wireless broadband services. Large private operators are well-positioned to build backhaul and switching facilities, though they are often reluctant to extend services into urban slums or rural areas. Local entrepreneurs or cooperatives, by contrast, can effectively aggregate local demand, mobilise resources, develop appropriate applications, and experiment with input combinations that better suit local needs. This often requires active support from local authorities to facilitate coordination, stimulate demand, and operate essential facilities.

Microtelcos are best positioned to take advantage of co-production because in each case the optimal combination of inputs contributed by local government, civil society, and the private sector will vary according to local conditions. For example, condominium systems and service cooperatives are better suited in cases where strong CBOs are already present (as in the case of the Chancay-Huaral project discussed below). Municipal network projects offer an alternative when strong local institutions exist (as in the Pirai case discussed below), when fiscal revenues are decentralised, or when the municipality is already involved in the delivery of other public services. Local entrepreneurship and capital may be activated when an enabling regulatory environment is present, and when complementary services (backhaul lines and e-government applications for example) are available. The most effective co-production arrangement for the provision of ICT services to the poor will thus depend on the institutional attributes of each community.

3. Enabling role of new technologies

Laying telecom wires is not unlike paving roads. It requires large upfront investments, economies of scale are pervasive, and the architecture of the network has to be carefully planned in advance because resources are not easily redeployed. The process involves making many *ex ante* assumptions about how services will be used, by whom, and at what price. As a result, ICT networks were typically built by large operators (mostly public in the past, mostly private today) who were positioned to assemble financing and manage the risks involved in network development. Recent innovations in wireless communication and service applications are nonetheless challenging these premises. These innovations are significantly reducing the minimum efficient scale of telecom providers, allowing a variety of new actors, from small entrepreneurs to municipalities to user cooperatives, to enter the market.

A leading example is the combination of new wireless local area networking (WLAN) technologies such as WiFi with wireless backbone solutions such as VSAT or the emerging WiMax standard for the provision of Internet access in remote areas.⁴ Low-cost WLAN systems have been deployed by small entrepreneurs and cooperatives to service rural communities in South Asia and Latin America at a cost several orders of magnitude below that of comparable wired solutions (Best 2003; Galperin 2005). Many small and mid-sized cities are taking advantage of these innovations to extend Internet access from a few broadband connections in government buildings to the entire community, thus lowering per-user costs. Local entrepreneurs are tinkering with the technology to build point-to-point links over several kilometres to connect communities that lack adequate wired backhaul infrastructure (or to bypass links controlled by incumbents).⁵

The much flatter cost curve of WLAN technologies undermines the comparative advantages of large operators in the deployment of local networks for broadband Internet access. While upfront costs are reduced, WLAN networks are also more easily scalable or redeployed, allowing microtelcos to make modest initial investments and scale up later following demand. Instead of poles and wires, WLAN technologies take advantage of a natural resource under-utilised in many poor areas: the radio spectrum. Therefore market entry is less defined by firm size than by spectrum allocation policies. Small wireless ISPs (WISPs) have flourished in countries where governments have opened frequency bands for unlicensed use, particularly in areas underserved by traditional operators.⁶

Furthermore, new mesh networking protocols are enabling the growth of condominium-style networks. This emerging architecture is based on end-users both receiving and relaying data from peer users, resulting in a network that can span a large area with only a few broadband links. This type of architecture is well suited in cases where backhaul links are scarce (and expensive), as is the case in many poor areas, as well as where spectrum is congested, since each network node need only transmit as far as the next node (which also minimises

power requirements, another concern in many poor areas). Another advantage is robustness: when each end-user is connected to several others, multiple data routes may be available, thus bypassing failed nodes. And as more nodes are added, total network capacity grows (Benkler 2002). While the technology is still emerging, pilot projects are already operational in Africa and elsewhere.⁷

New low-cost applications are having similar effects at the services layer. A leading example is voice over Internet protocol (VoIP), which refers to a family of technologies that allow packetisation and routing of voice communication over an Internet protocol (IP) network instead of a traditional circuit-switched network. There are many advantages to IP telephony, including lower costs and more efficient use of facilities, and many large operators are migrating calls from conventional PSTN to IP networks. But the technology is particularly relevant to microtelcos because it enables provision of telephony at a fraction of the investment needed to build and maintain a traditional telephone network (Graham and Ure 2005). Another advantage is that IP telephony is largely based in non-proprietary standards, and much of the equipment is available off-the-shelf for adaptation to local conditions.

A number of technological innovations are thus eroding the economic advantages hitherto enjoyed by large telecom operators, enabling microtelcos to extend ICT services further out into areas unattractive to conventional operators. These technologies share a number of advantages, among them lower costs, modularity based on open standards, less regulatory overhead, simple configuration and maintenance, scalability, and support for multiple applications. However, whether microtelcos and other new entrants are able to take advantage of these innovations depends to a large extent on the existence of technologically neutral market rules, which as we shall see below is not always the case in Latin America and the Caribbean.

4. Microtelcos in Latin America: Case studies

Critics often contend that arrangements other than large private utilities are inefficient and provide suboptimal public services (high tariffs, low quality) to the poor. In the next section we provide ample evidence to the contrary. Our findings, based on case studies from across the region that reflect different organisational arrangements, indicate that a variety of microtelcos are effectively servicing areas of little interest to traditional operators, providing affordable services and more generally acting as a catalyst for sustainable development in the communities they serve.

4.1 Telephone cooperatives in Argentina

A long-established model for microtelcos in Latin America and elsewhere is the telephone cooperative. This model is found for the most part in rural areas, where telephone cooperatives first emerged as the offspring of agricultural cooperatives estab-

lished for various other purposes.⁸ In Argentina, telephone cooperatives emerged in the early 1960s from efforts by local residents in areas poorly served by the former state-owned operator ENTEL. While not supported by the government, cooperatives were tolerated by ENTEL since they operated in areas considered unprofitable and brought modest revenues through tariff-sharing agreements.⁹ By 1965, over 100 telephone cooperatives were operating across the Argentine territory.

When reforms began in the telecom sector in 1990, there were over 300 telephone cooperatives, many of which were part of multi-service utilities that provided electricity and water services as well. With the privatisation of ENTEL, telephone cooperatives faced a period of uncertainty until 1992, when the government granted existing cooperatives a local telephony licence on similar terms to those granted to the new private incumbents (which included a seven-year exclusivity period). In 1999, faced with the imminent expiration of the exclusivity period, telephone cooperatives joined forces to enter the long distance and public telephony markets through the creation of a private subsidiary (TECOOP). By 2004, TECOOP operated approximately 230 public telephones, most of them located in remote areas.

Evaluating the performance of Argentine telephony cooperatives is difficult because of the sheer diversity of cases. Two-thirds of the cooperatives operate in small communities with fewer than 10,000 inhabitants, and the majority of them (57%) service fewer than 500 subscribers (although there are a handful of large cooperatives with over 5,000 subscribers). Overall, our findings indicate that telephone cooperatives have played a key role in extending basic as well as advanced ICT services outside the main urban areas. With over 600,000 subscribers, cooperatives account for about 8% of the Argentine fixed telephony market. In many of the poorest and more isolated provinces, however, their market share is much higher. In the province of Jujuy for example, cooperative lines represent 53% of total installed lines, while in Formosa they account for 46%.

Standards measures reveal that in most cases telephone cooperatives compare favourably with traditional operators despite serving the less desirable markets. As Table 1 shows, average teledensity in the markets served by cooperatives is only moderately lower than in areas served by traditional operators (which include all major urban centres). This is remarkable if one considers that, on average (and regardless of income), a rural household in Latin America is ten times less likely than an urban one to have a telephone line (Wallsten and Clarke 2002). In fact, if one disregards the Buenos Aires market (where the gap is higher because of the relatively high teledensity around the capital city), the difference in teledensity between the areas served by the incumbents and the areas served by the cooperatives is relatively small.

Our case studies also reveal that average prices for services provided by cooperatives tend to be similar or lower than those of large operators. In fixed telephony services, average connection costs are 32% lower for cooperatives. Prices for dial-up

Internet access services are comparable with those of larger operators, despite higher provision costs due to lack of competitive leased lines in rural areas (nonetheless prices for xDSL services were found to be significantly higher). Part of the cost advantage is explained by faster technological adoption. Motivated by the need to service customers in low-density areas at the lowest possible cost, cooperatives are constantly seeking lower-cost technologies appropriate for their business models. Telpin, a cooperative in a relatively wealthy community south of Buenos Aires, installed the first digital exchange in Argentina in the early 1980s, which enabled provision of a host of value-added services that the incumbent only offered after privatisation (Finquelievich and Kisilevsky 2005).

Cooperatives have also pioneered wireless last-mile and backhaul solutions. Local loop systems based on corDECT have been deployed by cooperatives in the provinces of Chubut, Neuquen and Cordoba, allowing fast network roll-out at a fraction of the cost of traditional copper. WiFi has been the technology of choice for many cooperatives providing broadband Internet access services. Cooperatives have also been eager to enter the wireless telephony market, since competition from wireless carriers has significantly affected revenue growth. The main effort is centred around the acquisition of a national wireless licence through Comarcoop, a joint venture

formed by several telephony and electricity cooperatives. There are also more localised efforts such as that of CoTeCal, a telephone cooperative in the remote Patagonia city of El Calafate, which has partnered with Chinese electronics giant Huawei and the provincial government to test CDMA450, a third-generation cellular telephony system better suited to service scarcely populated areas than traditional PCS systems.¹⁰

It is also important to acknowledge the spill-over benefits to the community as a whole associated with the telephone cooperative model. Our findings indicate that cooperatives have a significant involvement in ICT training and dissemination activities (which also serve to boost demand for value-added services), while many cooperatives have also engaged in local content development (typically community portals) in association with various CBOs and local governments. Despite the lack of subsidy payments from the government, many cooperatives set special tariffs for low income residents while others provide free services (particularly Internet access) to public schools and libraries. Finally, telephone cooperatives promote local capacity building and nurture community solidarity, two important ingredients long identified by development scholars as critical for empowering the poor (Birchall 2003).

4.2 Wireless community networks in Peru

Recently, a number of microtelcos have emerged from existing CBOs created for purposes other than the provision of ICT services. A project in the Chancay-Huaral valley of Peru illustrates this deployment and ownership model. The Chancay-Huaral river irrigates a large area of small-scale farming (95% of farms have fewer than ten hectares of land) on the sides of the valley. While the area has potential wealth due to its good land, abundant water and proximity to the markets of Lima and the north of the country, farmers have not been able to adapt their production to the fluctuations of the agricultural markets. Additionally, the inhabitants of the valley have little or no access to public services and the communications infrastructure available to them is at best precarious.

CEPES, a Peruvian NGO, reasoned that there was a connection between the lack of communication and services and the fact that farmers tended to grow the same crops regardless of market prices. They also noted that the lack of communications created problems for the efficient management of the waters of the Huaral river, a common resource used by the valley's farmers and managed by the Water Users Board, a cooperative organisation of the 17 Irrigation Commissions spread throughout the valley (which are in turn composed by farmers themselves, about 6,000 in total). To address these problems, CEPES proposed to establish an agricultural information and communication system for the valley, providing farmers with training and access to information that would enable them to make better decisions, and facilitating communication among the Irrigation Commissions to improve water management. Because the available communications infrastructure was

Province	Population in cooperative territories	Cooperative subscribers	Teledensity (A)	Total province teledensity (B)	(B-A)
Buenos Aires	686,736	109,568	16.0	22.0	-6.0
Catamarca	36,939	2,399	6.5	9.1	-2.6
Chaco	25,000	1,658	6.7	7.2	-0.5
Chubut	9,700	1,679	17.3	19.8	-2.5
Córdoba	183,950	27,837	15.1	18.4	-3.3
Formosa	82,000	8,472	10.3	4.5	5.8
Jujuy	146,000	11,285	7.7	6.3	1.4
La Pampa	7,265	1,493	20.6	19.4	1.2
Neuquén	128,000	18,884	14.8	13.4	1.4
Río Negro	25,200	2,547	10.1	15.9	-5.8
San Luis	39,980	5,251	13.1	13.5	-0.4
Santa Cruz	59,100	8,966	15.2	14.2	1.0
Santa Fe	268,054	41,813	15.6	18.9	-3.3
Total	1,698,284	241,852	14.2	19.2	-5.0
Total w/o Buenos Aires	1,011,548	132,284	13.1	15.5	-2.4

Source: Secretaría de Comunicaciones (SECOM).

inadequate, a WiFi network was deployed joining 12 villages in the valley and connecting them to the Internet through a shared 512 Kbps line and a VSAT link.

The desertification of Peru's coastal areas is a serious problem, and thus the local Irrigation Commission, which manages irrigation and other uses of water, is one of the most important CBOs for communities along the Chancay-Huaral valley. While the project was initiated by CEPES and funded by Peru's telecom development fund (FITEL), the Chancay-Huaral Water Users Board was selected as the owner/operator of the network because of its experience in managing infrastructure, its close contact with local farmers, and the presence of the Irrigation Commissions in each of the valley's villages. Beyond infrastructure deployment, the project emphasised the development and maintenance of a database of agricultural information, the training of farmers in the effective use of agricultural information, and the strengthening of local capacity for obtaining, distributing and using agricultural information.

As the project became operational, it also evolved to better meet local demand for ICT services. IP telephony quickly took on a central importance, not only for linking the local Irrigation Commissions and the Board but also for general use by local residents. Providing access to other local residents (beyond farmers themselves) also became a priority. Since available bandwidth far exceeds the needs of the Irrigation Commissions, a number of local institutions such as schools were invited to join the network. The Board is currently working to extend connectivity for other CBOs, public offices, and private entities, as well as to set up telecentres for the public at large.

While not immediately replicable, the Chancay-Huaral project illustrates a number of the advantages of the CBO-driven microtelco model. The adoption of IP telephony and the scaling of the network reveals the ability to rapidly adapt to community needs. While the decision to provide connectivity to other institutions and individuals stems in part from an interest to contribute to community development, it is also part of a sustainability plan based on cost-sharing by public, private, and civil society partners. Inter-local cooperation has also been critical, for each village is responsible for local network maintenance, with training provided by CEPES. In addition, new WLAN technologies have allowed flexibility in terms of service provision and scaling of the network with a modest initial investment.¹¹

4.3 Municipal networks in Brazil and Argentina

Municipal network projects recently have attracted much publicity (both good and bad).¹² Many question local government involvement in the provision of ICT services as the new face of the old state-utility model, noting its poor record of service quality, innovation, and network extension. Yet a closer look reveals significant differences. To begin with, the new breed of projects is led by local rather than national authorities. Under the right circumstances, the delivery of public services has been recognised to be more effectively organised at the local

level (Azfar and Cadwell 2003). Municipal network projects often start from this principle, delivering services tailored to local needs and integrating ICTs with broader economic and social development activities.

This is the case of Pirai, a rural municipality of about 25,000 inhabitants in the state of Rio de Janeiro, Brazil. The Digital Pirai project was started in the late 1990s when the municipality received a small grant from the federal government to modernise its local tax office. At the time, the entire local government ran on two phone lines and two computers. While part of these resources were earmarked for a hybrid fixed-wireless IP network to connect different government offices, local authorities realised that broadband connectivity could be extended to a much larger area at little extra cost. A community committee was then formed, which included municipal authorities and representatives from CBOs and the private sector, to chart a more ambitious plan that would extend wireless connectivity to much of the Pirai territory. The project was conceived as the cornerstone of a broader plan to diversify the local economy and attract new investments following privatisation (with significant lay-offs) of the state-owned power utility, then the largest local employer.

The community committee proved critical in securing partnerships with universities, NGOs, and private firms, which contributed to the project with equipment, application development, and expertise in the deployment and operation of the municipal network. The project focused on four areas: e-government (the original remit of the initiative), education (including distance education in partnership with a consortium of public universities), public access points (including training in partnership with various NGOs) and SME adoption. To date, the network has over 50 broadband nodes, connecting all local government offices and most of the public schools and libraries. There is also a growing number of public access points, and a private company with majority municipal ownership has been formed to commercialise services to households and businesses.

The lessons from the Pirai case point to several success factors. First, the lack of public subsidies (beyond the small grant to modernise the tax office) forced community leaders to draw in resources through cooperation with a variety of actors from the private and civil society sectors (both local and otherwise). Inputs were thus assembled through a combination of in-kind contributions, partnerships, and the city's modest budget. Second, the use of low-cost technologies at the transport (i.e., WLAN) and terminal (i.e., open-source software) layers dramatically reduced upfront costs, allowing Pirai to provide broadband services where traditional cable and xDSL operators could not justify investments.¹³ Finally, local leadership, good governance and strong social capital enabled collective planning and management of the project, contributing to better match services with local needs.

The case for municipal networks is stronger when the local government is already providing other public services (e.g., electricity and sanitation), since economies of scope often

allow provision of ICT services at minimal extra costs. A good example is the Sistema de Comunicaciones Multimediales (SICOMU) initiative in the Argentine province of La Pampa. This case illustrates the combination of market failures, economies of scope, and internal needs that often drive the municipal microtelco model. The project began as an appendix to the construction of a large aqueduct undertaken by the provincial government. Having contracted for over 1,300 kilometres of aqueduct building and secured the necessary rights-of-way, provincial authorities decided to lay telecom fibre alongside the aqueduct.

The network was initially conceived as an Intranet that would support the internal control systems for the operation of the aqueduct. However, it soon became evident that excess capacity could be utilised to service municipalities along the aqueduct route with minimal incremental investments in feeder lines. The provincial government thus enlisted 21 municipalities to participate in the project, most of them rural communities with few other connectivity alternatives. While the provincial government operates the network backbone (the fibre along the aqueduct and feeder lines), each of the municipalities is responsible for extending the network to local government offices, hospitals, schools and public libraries, as well as selecting and managing the services provided at the local level (which range from e-government applications to IP telephony).

Other local actors also provide important complementary assets. The local university (Universidad Nacional de La Pampa) is utilising the network for a variety of distance education initiatives (the university's only campus is located in the provincial capital of Santa Rosa). The local branch of the National Institute for Agricultural Technology (INTA) has made available online consultation and support services to local farmers. In addition, about half of the total network capacity is being offered as dark fibre to third parties for the commercialisation of services in all or parts of the network. This is expected to offset a substantial part of the operating costs of the project. Local electricity cooperatives have already contracted to begin offering telephony services.

Whereas the public utilities of the past financed, built, and operated the entire network, municipal ICT projects today are more likely characterised by different degrees of cooperation with the private sector, CBOs, and other organisations (often educational institutions). Our findings indicate that municipal network projects aim at facilitating investments in underserved areas rather than competing with established operators. They also suggest how, as one of the largest users of ICT services in the community, local governments benefit from financing and/or managing their own infrastructure where private operators fail to invest adequately. Many municipal networks have emerged from the need to equip local government offices and public entities (schools, libraries, police stations, health centres, etc.) with better ICT access, later evolving into broader initiatives that service local businesses and residents. While further research is needed, preliminary findings

suggest that both municipal and provincial authorities have an array of roles to play in spurring ICT development at the local level.

4.4 Small private operators in Colombia

While Colombia is among the few nations in the region that have not fully privatised their legacy operators, the liberalisation of the telecom market in 1994 has resulted in significant private investments in the sector. A large part of these investments has flowed into mobile telephony as well as into the legacy municipal operators, which have been privatised to varying degrees (Telecom, the national operator, remains public).¹⁴ Yet market reforms have also resulted in the emergence of a number of small private operators, many of them serving areas poorly served by the incumbents. While some of these operators are affiliates of larger firms with presence in various local markets, others are the product of independent efforts by small entrepreneurs who bear the majority of the risks themselves.

The evidence suggests that small-scale private operators are gaining ground in the Colombian market. As the total number of fixed lines roughly doubled between 1994 and 2002, the number of lines controlled by small operators more than tripled in the same period, increasing their share from 7% in 1994 to 11% in 2002.¹⁵ Available data also reveals that small-scale operators compare favourably with larger firms on standard quality measures. The Quality Index computed by the Colombian regulator (which is factored into price regulations) reveals that small operators consistently outperform larger operators as measured by traditional quality indicators (faults per 100 lines, average days to obtain new connection, average days to repair a faulty line) as well as subscriber satisfaction surveys.¹⁶

Small private operators nonetheless still face a myriad of challenges, even when serving areas neglected by incumbents, which the case of TELEOCSA illustrates well. The birth of TELEOCSA dates back to the early 1990s when a group of community leaders from Puente Piedra, a small town near the capital city of Bogotá, approached the national operator (Telecom) to request the extension of local telephony services to the community. Lacking the capital and the incentives to fulfil the request, Telecom instead proposed to community leaders that local residents purchase the equipment (including switches and cabling), deploy the network, and later transfer ownership of all facilities to Telecom, which would then operate the network and provide interconnection with its long distance lines.

Lacking alternatives, community leaders agreed to these terms and the project was started soon after. With the passing of the new telecom law in 1994, allowing unrestricted private sector participation in the provision of local telephony, community leaders changed course and decided to create a private local operator rather than transfer ownership to Telecom. A year later, TELEOCSA was incorporated and obtained a local operator licence. What ensued was a protracted regulatory bat-

tle between the new company and the incumbent, which not only refused to interconnect but asserted ownership over TELEOCSA's facilities, even when the totality of the investment was borne by local residents. At its peak in 2002, TELEOCSA had 1,200 subscribers, but after several unsuccessful attempts to obtain interconnection with Telecom's long distance network the project was folded in November 2004.

This case illustrates the need for a vigilant regulator to protect new entrants from anti-competitive strategies by the incumbents in control of higher-level facilities. While this is the case for any new entrant, it is particularly important for the emergence and survival of microtelcos, which cannot bargain effectively with incumbents and typically lack the resources or expertise to wage lengthy regulatory or judicial battles. The next section discusses this and other regulatory obstacles faced by microtelcos.

5. Need for an enabling regulatory environment

Regulatory constraints have long been a major barrier to entry in the ICT markets of Latin America and the Caribbean. Despite ongoing reforms, our findings indicate that microtelcos face a myriad of regulatory barriers that discourage entry, limit scalability and constrain experimentation with new technologies and business models better suited to service high cost/low income areas.

5.1 Spectrum access

Our case studies suggest that WiFi and other WLAN technologies represent key enabling technologies for microtelcos, having been deployed to provide a variety of services (from broadband Internet access to VoIP) in different social and geographic contexts. This, however, is premised on the availability of the frequency bands in which these technologies operate (2.4 GHz and 5 GHz). International experience reveals that spectrum policies that provide for unlicensed access to these bands empower microtelcos by facilitating rapid infrastructure deployment without the lengthy administrative procedures traditionally associated with wireless networks (Bar and Galperin 2004).

In recent years, countries in the Latin American and Caribbean region have been reforming spectrum administration to allow for increased unlicensed use by low-power devices (such as WiFi radios) in these bands. However, our findings from a survey of 25 countries in the region reveal that significant roadblocks persist.¹⁷ The vast majority (82%) of the countries in the region have taken steps to allow for unlicensed WLAN deployment in the 2.4 GHz band, though about a third of them still require public access points to be registered with the telecom authority. While this is encouraging, in many countries power restrictions significantly limit outdoors deployment opportunities (and thus the appeal of the technology for new service providers). Overall, a third of the countries have set power limits below 1W (the FCC standard), thus limit-

ing the potential reach of WiFi signals to a few hundred metres at best (although in certain cases such as Brazil and Peru exceptions are made for the less populated areas).¹⁸

In the 5 GHz band, the situation is less encouraging. About two-thirds of the countries (68%) allow unlicensed operation in the upper portion of the band (5.725-5.850 MHz), and of those 40% require equipment registration with the telecom authorities. Moreover, of the countries where unlicensed use is authorised, 40% of them restrict power below 1 W (the FCC standard).¹⁹ In the lower portion of the band (5.150-5.350 MHz), only about a third (35%) of the countries in the region authorise unlicensed use in these frequencies, and in most of these cases operation is limited to indoor spaces.²⁰ Finally, only Brazil, Panama and Colombia have so far authorised unlicensed use in the middle portion of the 5 GHz band (5.470-5.725 MHz). Although this is expected to change in the medium term as these frequencies have only recently been designated by the ITU for WLAN devices, there are less encouraging cases such as Mexico where telecom authorities have recently designated the band for licensed use exclusively.

5.2 Licensing

Licensing rules often discriminate against microtelcos, either implicitly by requiring lengthy administrative procedures that microtelcos are unable to navigate, or explicitly by preventing non-traditional operators from controlling network components or supplying services. As an example, telephone cooperatives in Argentina are legally barred from offering broadcasting and other complementary services, thus preventing bundling strategies. In Peru, the Chancay-Huaral project, discussed above, was prevented from terminating voice calls in the PSTN because of the lack of a telecom operator licence (obtaining such a licence entails a lengthy administrative procedure which also triggers a number of financial obligations, including a contribution of 1% of operating revenues to the Peruvian telecom development fund). It is nonetheless encouraging that many nations are moving towards a differentiated licensing regime with less burdensome requirements for rural and underserved areas (this is the case of Peru and Argentina, among others).

5.3 Lack of technological neutrality

In the name of consumer protection, ICT services are sometimes subject to overly strict quality of service and engineering standards that preclude microtelcos from deploying low-cost solutions. This discourages seeking price/quality combinations better suited for the poor, and reduces opportunities for bypassing essential facilities controlled by incumbents. The case of VoIP is illustrative. Our survey of 18 countries in the region found that less than half of them (38%) have authorised the use of IP networks to provide telephony services. Interestingly, only a handful explicitly prohibit the use of VoIP: in most cases, the technology is in a legal limbo, neither completely legal nor illegal.

This has not prevented many local entrepreneurs from offering VoIP services. In most countries in the region, telecentre operators offer long distance calls over broadband connections at a fraction of the cost of incumbent carriers. Analysts estimate that Latin America accounts for 35% of global VoIP traffic (compared to 9% of PSTN).²¹ Yet lack of legal protection has discouraged further investments, and reports of government crackdowns on establishments and firms offering VoIP services on the grey market are not uncommon.

Another illustrative case concerns the service restrictions placed on the use of WLAN technologies. As discussed, in several cases the use of WLAN technologies is restricted to indoor spaces or private use, thus reducing the value of WLAN solutions as a last-mile access alternative for microtelcos. This was the case, until recently, of the 2.4 GHz band in Peru, which required the Water Users Board in Chancay-Huaral to seek a special waiver from OSIPTEL (the Peruvian regulator) to deploy its network (the rules have since then been modified to allow outdoors deployment in underserved areas). There are also cases in which specific services are prohibited, such as in Argentina where regulators have recently prohibited the supply of telephony services over WLANs in the major metropolitan areas. As innovations continue to enhance the reach and capacity of wireless solutions, incumbents will attempt to seek protection against disruptive technologies, which will require increased regulatory vigilance to accepted principles of technological neutrality.

5.4 Lack of financing

For traditional carriers servicing poor or distant communities, subsidy payments are often available through universal service and telecom development funds. In some cases, the administration of these funds discriminates against microtelcos by aggregating targeted areas and centralising project management functions. The unintended result is that only large operators with a regional or national presence are able to compete for funds. This was for example the case of the Compartel program in Colombia, where in 1999 a large contract for the development of community telecentres was split between Gilat (670 telecentres) and Telefónica (270 telecentres). While this reduces administrative costs, it also jeopardises long-term sustainability since services are dependent on the availability of external subsidies and unresponsive to local needs. Centralised projects are also more vulnerable to political patronage, as was the case with the failed CTC initiative in Argentina (Galperin 2005).

5.5 Access to essential facilities

The provision of telecommunications services at the local level requires access to switching facilities and trunk lines often controlled by incumbent operators. Like many other new entrants, microtelcos often face discriminatory access to these facilities. While Latin American regulators are increasingly engaged in the oversight of interconnection contracts between incumbents and new entrants, their limited resources pose

challenges to effective implementation. For example, a recent study found that few nations in the region provide guidance to the pricing and interconnection arrangements between incumbents and new entrants in the provision of broadband Internet access services (Regulatel 2005). Lack of regulatory attention to issues of non-discriminatory access to essential facilities discourages entry by increasing the risks associated with last-mile infrastructure deployment. This is clearly illustrated in the case of TELEOCSA.

6. Conclusions

Market reforms in the ICT sector in Latin America and the Caribbean have not paid sufficient attention to the important role that microtelcos play in the supply of services in thin markets outside the main urban centres. These operators have been found to provide services comparable to those of traditional operators in high cost/low income areas with minimal public subsidies. They do so through a variety of innovative business and co-production strategies, combining inputs from local entrepreneurs, municipal authorities, and CBOs to address ICT needs in markets considered unprofitable by traditional operators.

One of the main advantages of microtelcos is their ability to adopt the technologies and business models best suited to serve local residents at different price/quality points. A variety of local conditions determine the optimal organisation and combination of inputs for microtelcos, including the economic and social profile of the community, geographic factors (terrain, distance to urban centres, etc.) and the structure of the overall telecom market. However, our findings reveal that institutional factors are also critical. When good local governance exists (as in the Piraí case), municipal networks offer a promising alternative for spurring network roll-out. When strong CBOs are present (as in the Chancay-Huaral case), microtelco projects may benefit from building upon their integration into the economic and social fabric of the community. In many cases local resources and entrepreneurship can be effectively activated (as in the TELEOCSA case), but this requires active regulatory support to prevent anti-competitive manoeuvring by the incumbents.

Overall, our findings suggest that a level playing field for microtelcos is lacking. There is however encouraging evidence that the regulatory mood is changing. Principles such as technological neutrality, open access to essential facilities, and a public good rationale in certain ICT network components are beginning to take hold. Several nations have loosened licensing, spectrum access and tariff regulations to stimulate telecom investments in rural areas. There is also increasing recognition among policymakers that, alongside private operators, public-private-CBO partnerships have an important role to play in extending networks and services to the rural poor. Finally, universal access programs in many nations now provide support for microtelco projects alongside large-scale sub-

sidy schemes. Our findings provide support for these second generation reforms that acknowledge the diversification of ICT supply and community development spill-overs as important principles in the design and implementation of ICT policies in the region.

Notes

¹ Research support was provided by Sylvia Cadena and Diego Pando. We would like to thank Francisco Proenza, François Bar and Miguel Saravia, along with our colleagues from the Regional Dialogue on the Information Society (DIRSI), for comments on earlier drafts.

² There is a vast literature that documents these changes. For an overview see Noll (2000).

³ This is not the case however with smart subsidies which are increasingly used by telecom funds in Latin America and elsewhere (see Wellenius 2001).

⁴ For a detailed discussion of these technologies see Mallalieu and Rocke (2005).

⁵ There are also a number of last-mile wireless alternatives, and the selection of the technology will often depend on factors such as geography, population density and services required. One promising technology used by microtelcos in Brazil and Argentina is corDECT. Developed at the Indian Institute of Technology, corDECT is a wireless local loop (WLL) technology designed to provide cost-effective, simultaneous high-quality PSTN compatible voice and high speed data connectivity for rural areas. With corDECT, rural connectivity costs are reduced from USD 1,500 to about USD 300 per line (Jhunjhunwala 2000). The corDECT system is also highly modular – a single switch system can economically scale from 100 to 5,000 subscribers.

⁶ In the US, which first allowed unlicensed operation of radio devices and today provides over 550 MHz of spectrum on a licence-exempt basis, there are an estimated 6,000 mom-and-pop WISPs servicing rural and other areas underserved by traditional broadband operators (FCC Wireless Broadband Access Task Force 2005).

⁷ See <<http://www.meraka.org.za>> for pilots in rural Africa.

⁸ The notable exception is Bolivia, where cooperatives also service the major urban areas. The case is nonetheless atypical, for Bolivia's telephone cooperatives are not the product of organised efforts by users but were rather created by the government in 1985 to replace the incumbent municipal telephone companies (Calzada and Dávalos 2005).

⁹ For much of the monopoly era (until 1990) the revenue-sharing agreement for long distance calls between ENTEL and the cooperatives worked as follows: 60% corresponded to ENTEL, while the remaining 40% corresponded to the local cooperative.

¹⁰ CDMA450 works on a lower frequency band (450 MHz), and thus requires considerably fewer towers to cover an extensive area.

¹¹ The initial investment reached USD 33,600, or about USD 2,800 per village.

¹² It is important to distinguish municipal *networks* from municipal *e-government* initiatives. Broadly speaking, municipal e-government concerns the provision of local government services over an existing network platform provided by third parties, as well as the use of ICTs to improve internal government operations. By contrast, our attention is on

municipal network projects where the local government is involved – in a variety of different ways – in the deployment of the infrastructure and the delivery of ICT services to the public.

¹³ According to estimates by Franklin Dias Coelho, general project coordinator of Digital Pirai, the city was able to reduce deployment and operation costs by a factor of eight (personal interview).

¹⁴ For further details, see Uribe Botero (2005).

¹⁵ Source: Comisión de Regulación de Telecomunicaciones (CRT), <<http://www.crt.gov.co/>>.

¹⁶ In 2001, for example, the average Quality Index score (on a 100-point scale) for small operators was 90.1, compared to 89.4 for medium-size operators and 87 for large operators. Source: Authors' own calculations based on CRT (2002).

¹⁷ The database is available from on the WILAC website <<http://www.wilac.net>>.

¹⁸ In Brazil for example, the power limit is set at 400 mW for areas with more than 500,000 inhabitants, increasing to 1 W for areas below 500,000.

¹⁹ These power restrictions represent an even more serious constraint for service providers because of the propagation characteristics of radio signals at 5 GHz.

²⁰ While indoor-only use is the international norm in the 5.150-5.250 MHz portion of the lower 5 GHz band, many countries allow for outdoor use in the 5.250-5.350 MHz range.

²¹ See: <<http://www.telegeography.com>>.

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Research and Education Network in Ghana: Promoting ICT in developing countries through research cooperation¹

Reza Tadayoni & Knud Erik Skouby

1. Introduction

It is generally acknowledged that information and communication technologies (ICTs) have generic characteristics, i.e., that these technologies by and large are the basis for the production, distribution and consumption processes in contemporary societies. This development is associated with concepts such as pervasive computing and an emerging new techno-economic paradigm with convergence between information technology (IT), computing and mass media as a driving force. To reap the benefits of this, many industrialised and industrialising states since the mid-1990s have produced one or several plans for the Information Economy. At the European level, the European Union White Paper on growth and competitiveness, the Bangemann Report and Towards the Information Society were issued in 1993, 1994 and 1995 respectively. In other parts of the world, countries such as the US, Japan, Singapore, South Korea, Canada and Australia have all published national plans during these years, as have some developing countries in Asia and Africa, such as Malaysia, Thailand, the Philippines and Ghana.

An analysis of these plans shows uniformity in expectations and goals. ICT is expected to revolutionise ways in which we produce, the way we distribute the results of production and patterns of consumption. In reality many of the plans do not proceed further than general statements, but all of them include an explicit political determination to be at the forefront of the technological development initiated by ICT. This tendency is very pronounced in most of the developing country cases, including the Ghanaian plan – *Ghana 2020*. Industrialised countries having formulated more specific strategies, are in reality less concerned with the revolutionary potential of ICT than with strengthening existing industrial strongholds,

i.e., traditional industrial policy (Henten et al. 1996; Henten and Kristensen 2000). The impact of ICT policies in different countries and regions has been subject to research studies with impact of political willingness being shown as vital. There are however other parameters, such as poverty levels and cultural issues that also influence penetration and use of ICT (Aizu 2002; Selhofer and Mayringer 2001).

The relatively low income levels in the developing countries generally explain the low level of ICT development. To cope with this, foreign direct investment (FDI) has been suggested as a method of promoting ICT development in developing countries (Zhu 2001). In this project, a different approach is suggested, for which the development of ICT is included as a part of foreign assistance to developing countries – for research cooperation and assistance. The approach has generally been considered as relevant by different world organisations and cemented by the establishment of the UN task force for ICT development in developing countries.

To explore specifically the potential for ICT as related to general social priorities such as free access to information and its use in education and research, a team of Ghanaian and Danish researchers and practitioners have been working since 1996 to implement ICT in these areas. The focus has been on applications and users testing different technical solutions, their costs and applicability.

Work has so far been organised within and around two projects, the Technology Assessment Project (TAP), sponsored the Danish International Development Assistance program (Danida) and the Interlibrary Lending and Document Delivery in Developing Countries project sponsored by the International Federation of Library Associations and Institutions (IFLA) and Danida.

One of the key objectives has been to establish a research and education network connecting different universities and research institutions within Ghana and also beyond via the Internet. A combination of HF, VHF and microwave solutions has been used to implement connectivity between university libraries dispersed over a wide geographical area and with different distances to the University of Ghana in Accra. The university was then connected to the Internet backbone through a VSAT connection grounded in Denmark.

The remainder of this section provides a brief overview of Ghana. In Section 2 we describe the case and identify the drivers, barriers and lessons learned. Section 3 outlines the implications of the case on research and education in Ghanaian universities and research institutions. Section 4 concludes with comments on future perspectives.

1.1 Ghana in brief

The Republic of Ghana, formerly known as the Gold Coast, lies on the coast of West Africa. Its population of 19.4 million consists of over 50 different ethnic groups speaking various languages and dialects. Despite its great cultural diversity, Ghana has avoided any major ethnic conflict throughout its 44-year history as an independent nation. While English is the official language, the major dialects of Twi, Ga, Fanti, Ewe and Hausa

are prevalent. Ghana's main urban centres are Accra (the capital), Kumasi, Cape Coast, and Takoradi.²

The map of Ghana is shown in Figure 1. Bold arrows indicate the locations that took part in the project described in this chapter.

The five public universities involved in project are:

- University of Ghana at Legon;
- Kwame Nkrumah University of Science and Technology at Kumasi;
- University of Cape Coast;
- University College of Education at Winneba; and
- University of Development Studies at Tamale.

The University of Ghana is the oldest and largest of the five, founded in 1948 as the University College of the Gold Coast, and originally an affiliate college of the University of London, which supervised its academic programs and awarded degrees. It gained full university status in 1961, and now has nearly 24,000 students.

In addition to the public universities there are also a number of private universities and public and private research institutions. The project did not include private universities but one of the research institutions, the Council for Scientific and Industrial Research (CSIR) located in Accra, was heavily involved in the project.

1.2 Overview of ICT development in Ghana

Figure 2 shows the penetration of mobile and fixed services in Ghana, which has been quite low. However, growth in the mobile sector has had radical impact on this development.

Figure 3, shows the continuation of this development, according to estimates based on general economic stability,

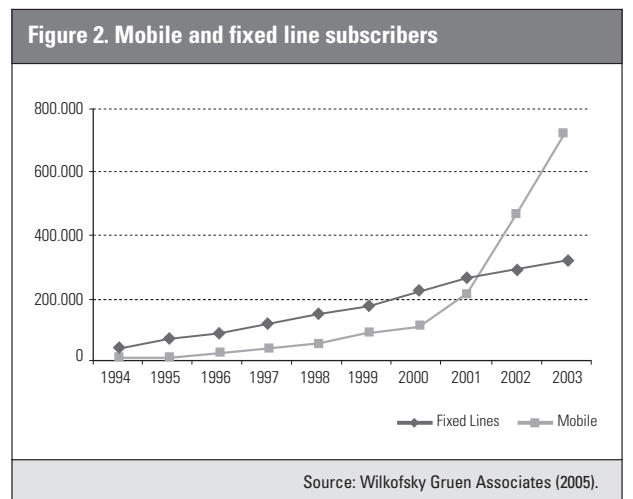


Figure 3. Estimates of development of mobile and fixed line subscribers

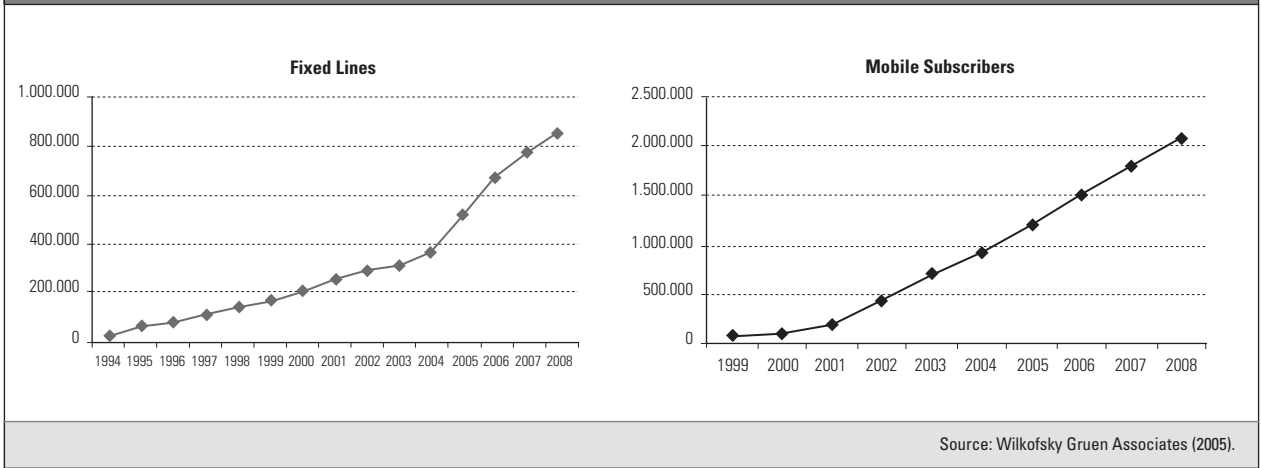


Figure 4. Internet users and subscribers

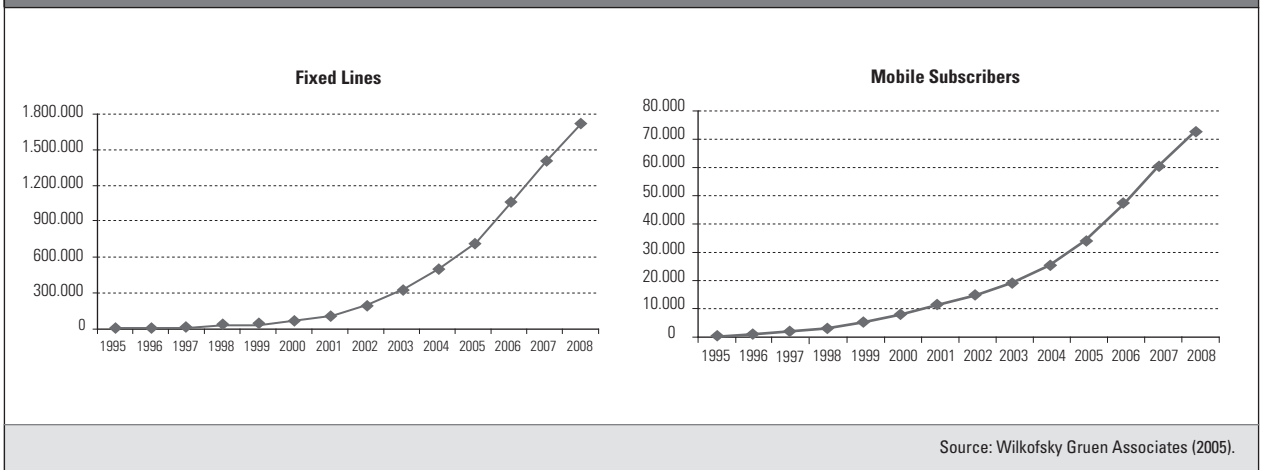
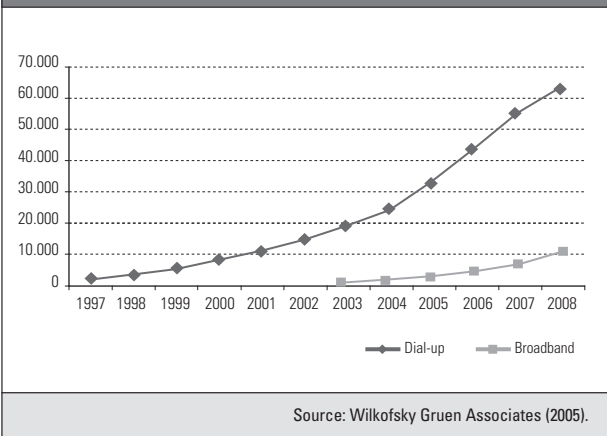


Figure 5. Internet users and subscribers by category



inflation coming down and the relative stability of the Ghanaian currency (cedi), enabling Ghana Telecom to obtain overseas loans to keep their current plans.

Figures 4 and 5 show that penetration of Internet subscription is not very high and is mainly dominated by dial-up connections. However, Internet use is relatively high, due to the availability and popularity of Internet cafes and telecentres.

Broadband accounts for only a marginal portion of the Internet landscape. This is due to the late availability of broadband offerings for residential customers and their high cost. In mid-2006, Ghana Telecom began a massive marketing campaign to create awareness and attract new subscribers. In addition to Ghana Telecom's DSL technology, there are also a number of WiFi and other wireless operators.

2. Research and Education Network in Ghana

This section begins with some historical background for the initiatives and then describes the library project and the research and education network. Finally, the experiences and the drivers and barriers are outlined.

2.1 Background

In May 1996, a USAID mission to West Africa explored possibilities for providing Internet connectivity to the university communities. The primary purpose of the mission was to determine the state of readiness for Internet connectivity in different countries and to assist in devising plans for establishing such connectivity including funding. Assessments of existing telecom facilities were also made. In the case of Ghana it was concluded that additional investments were needed as a precondition for establishing Internet connectivity and that this was likely to be met through cooperation with Danish researchers.

Following this mission, as documented in the so-called Sadowsky report, USAID agreed to finance Internet connectivity under its policy derived from the Leyland Initiative, provided that necessary data and telecom infrastructure requirements were made available without assistance from USAID.

Soon after the USAID agreement to finance Internet connectivity, the University of Ghana in close cooperation with the Center for Tele-Information (now called the Center for ICT – CICT) at the Technical University of Denmark submitted a proposal for a New Data and Communications Infrastructure to the Danish Embassy in Accra. In 1998, the Danish Embassy in Ghana agreed to finance the backbone part of the new infrastructure – a network ring, proposed by the Center for Tele-Information.

In parallel with these projects, activities for a project sponsored by IFLA and Danida were directed towards establishing inter-lending facilities for Ghanaian university libraries enabling them to use library resources in Western Europe/Denmark.

It was decided to form a collaboration between the CICT projects and the IFLA project by including a technical task in the IFLA project. This resulted in a proposal for an electronic library network. This network was aimed at establishing connection between the five regional research libraries (Cape Coast, CSIR Accra, Kumasi, Tamale and Winneba) and the Balme Library at the University of Ghana. The network would have Internet access via the Balme connection.

The Library Network was planned with a shortwave/HF-solution as the core technology, but as the project is a pilot for future international implementation it was foreseen from the beginning that other technologies would also be introduced and tested. Currently the network is established as a mixed solution using shortwave (HF), VHF and microwave connections to the Balme Library.

From the beginning it was considered as a precondition for the project that it demonstrate long-term financial self-sustain-

ability. To assure this, firm commitments were sought from organisations willing and able to pay contributions adding up to cover the costs associated with the project. These included not only the running communication costs, but also administration, technical maintenance and development of the system.

It turned out that the slowness (and the low quality of service) of the Internet connection was a major bottleneck for taking advantage of the new possibilities these initiatives enabled. To solve the problem a new project was proposed by CICT to establish a research and education network (R&E Net) in Ghana with direct connectivity to the Internet backbone. The system was implemented with the intention of connecting as many Ghanaian universities and research institutions as possible to this network. The capacity of the network was to be increased as the demand increased.

There emerged, however, also regulatory, technical and organisational barriers in the process of establishing the infrastructure. The major regulatory barrier in the process was frequency assignment for the licensed bands of the radio spectrum. The technical and organisational problems mainly involved a lack of trained technical personnel in the beginning of the project and lack of organisational experience for the project.

Box 1. Improved working conditions for researchers

The need for improved access to the Internet was obvious from the beginning. Even at the University of Ghana researchers wasted much time physically moving to a specific location for checking email and accessing the Internet. Only a few departments at the university had established direct access to the university Internet backbone. One researcher, who was heavily involved in the project, was from Department of Political Science, which had no connections to the university Internet backbone.

To provide hands-on experience with the WiFi technology, in the initial phase of the project, a wireless link was established between the Internet backbone and the Department of Political Science. This turned out to extend beyond a simple technical test and had far reaching implications for the department's teaching and research.

Soon after the establishment of the link, the department invested in a number of PCs, created a local area network and connected it to this link. ICT became a visible component within the department, of course dramatically reducing the time students and researchers used for accessing their emails and the Internet.

2.2 The IFLA and Danida Library Project

The objective of the technical task in the Library Network project was for the first phase to implement an Internet access to Balme Library and in the second phase to connect the participating libraries to the Internet via the Balme Library connection to the university network.

As the IFLA project was a trial, the intention was to investigate different technological solutions and implement some of them to obtain experience which could be used in other projects, both in Ghana and other countries.

The selection of Ghana and the involved libraries has been subsequently found to have been a quite good choice regarding the project's objective. The participating libraries have different characteristics regarding both their distance to the Balme Library and their level of telecom infrastructure development. In Table 1 the different libraries are described in the light of these two important characteristics. These different characteristics resulted in choosing different technological solutions for connecting the sites, described in the following section.

2.2.1 Implementation I: Connecting Balme Library to the Internet

This part of the project began towards the end of 1996 with a discussion of how plans for establishing the Internet connection to Balme Library could be coordinated with plans for implementing a backbone-ring as the beginning of a modern tele- and data-communication infrastructure for the University of Ghana at Legon.

In mid-1998, a connection was implemented between Balme Library's LAN and the university backbone-ring. The

backbone-ring was connected to NCS, the local Internet service provider in Accra, via a radio link.

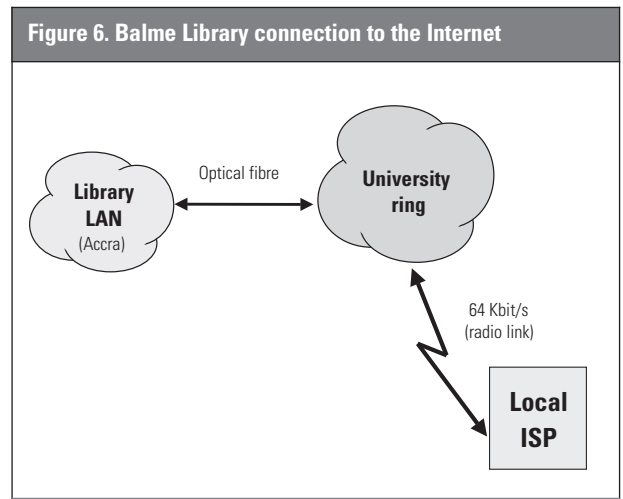
As depicted in Figure 6, the technological solution deployed to connect the Library Network to the backbone-ring was a simple one. Due to the short distance, the connection was implemented using optical fibre with Internet connectivity provided by a local ISP.

2.2.2 Implementation II: Connections between the libraries and the Balme Library

During the initial investigations there was a clear objective to find optimal technological solutions in view of the above-mentioned characteristics of the different sites. But there were some basic requirements to the solutions.

An important requirement was that the system be cheap (almost free when used). The Danida project, like other projects, had a limited duration and the system should be usable also after the project was finished, meaning that operation and maintenance costs should be as low as possible.

A second requirement was that the system be independent of the telephone infrastructure. This was because the system was also to be used in geographical areas where either no tele-



Participating library	Distance to Balme Library	Telecom development
Tamale	Approx. 600 km very long distance	Bad telephone connections. Almost unusable regarding the objective (implementing data connection).
Kumasi	Approx. 300 km long distance	Good telephone connections but expensive to use because of rates for remote areas.
Cape Coast	Approx. 120 km distance is still considerable	Good telephone connections but expensive to use because of rates for remote areas.
Winneba	Approx. 60 km short distance	Good telephone connections but expensive to use because of rates for remote areas.
Korlebu	Approx. 13 km short distance	Good telephone connections and not so expensive to use because of local rates. But capacity is incomparable with the alternative solutions.
CSIR	Approx. 6 km short distance	Good telephone connections and not so expensive to use because of local rates. But the capacity is incomparable with the alternative solutions.

Participating library	Technical solution	Link Capacity
Tamale	HF	2.4 Kbit/s
Kumasi	HF	2.4 Kbit/s
Cape Coast	HF	2.4 Kbit/s
Winneba	VHF/UHF	33 Kbit/s
CSIR	Microwave	3 Mbit/s
Korlebu	Microwave	1 Mbit/s

phone network is available or the telephone network is of bad quality and/or expensive (see Table 1).

To meet these requirements it was necessary to base the solutions on wireless technologies and to use free frequency resources in the radio spectrum. From the beginning it was obvious that for long distances the establishment costs for implementing high speed solutions was too high to be realistic, for example, requiring many repeater stations to reach Tamale from Accra.

The results of the initial investigation showed that there were solutions that could reach remote sites without repeaters. These were based on the shortwave (HF) related technologies. The drawback of these solutions is that data capacity of the system is low. In spite of this drawback it was viewed as attractive mainly due to its cost profile and it was decided to try the system. In the end, however, this type of system was simply too expensive or in reality not available on the market.

This led to the formulation of a transition phase during which dial-up connections were implemented in all remote sites to begin Internet access and to promote results in the IFLA project. The high cost of system use was accepted as necessary to start the project. The dial-up connections were usable in all sites except for Tamale where phone quality was very bad.

The HF products were developed and delivered according to project specifications and were installed in two of the most remote sites – Tamale and Kumasi. Figure 7 illustrates the status of the Library Network during this phase. As it is shown, the

local ISP was replaced by a VSAT connection directly to the Internet backbone (see below for further detail on the VSAT link).

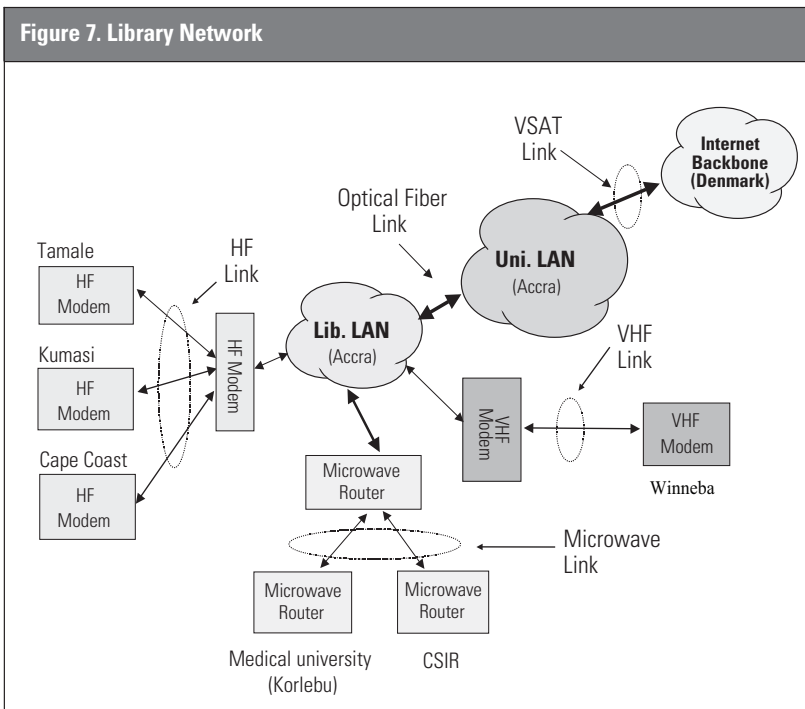
The HF solution was also implemented in Cape Coast, whereas for Winneba, because of its relatively shorter distance, a VHF solution was used. For the sites that are closer to Legon, CSIR/Accra and Korlebu, a microwave (point-to-point) solution was deployed. The link capacities of these different technical solutions are outlined in Table 2.

2.3 Research and Education Network

A major bottleneck for the IFLA/Danida Library Network was the slow Internet connection provided by the local ISP. Buying more capacity from the current provider was an option to increase the available capacity, but this solution was considered to be expensive and unreliable. Experience showed that the local ISP's system had frequent and long down-periods and further the delivered capacity often failed to match the promised capacity.

2.3.1 Technical implementation

Given these limitations in the established system, it was decided to implement a different solution using a satellite (VSAT) connection to link the research and education institutions in Ghana to an Internet connection point (in this case positioned in Denmark). This solution demanded a separate organisational structure (see below), had high start-up costs, but was cheaper for users. Moreover, the solution was 'future safe',



being easily upgradeable. From a research and education perspective it was a more viable solution, because the university obtained control over the Internet connection to the outside world.

As depicted in Figure 8, the network was envisaged as consisting of different research and education institutions with the established university ring at the University of Ghana at Legon and the Library Network as associated networks.

Connection to other institutions in the Accra area, such as CSIR and Korlebu, was established via microwave point-to-point connections. The solution was immediately significant for institutions in and around Accra with a distance of about 20 to 30 kilometres from the University of Ghana at Legon. For institutions farther away needing a connection, different solutions had to be found, e.g., with the Library Network being associated with the solution, or using the fibre ring installed by the Volta Region power company in the southern region of Ghana. When the R&E Network was established the universities in Kumasi and Cape Coast were connected to the network via this fibre ring. Kumasi and Cape Coast both had a connection through the Library Network as described above and also through a fibre connection (illustrated in the figure). As the library connection was based on HF technology and was very low speed (compared to the fibre connection) there was little incentive to use it. There was, however, a crucial difference

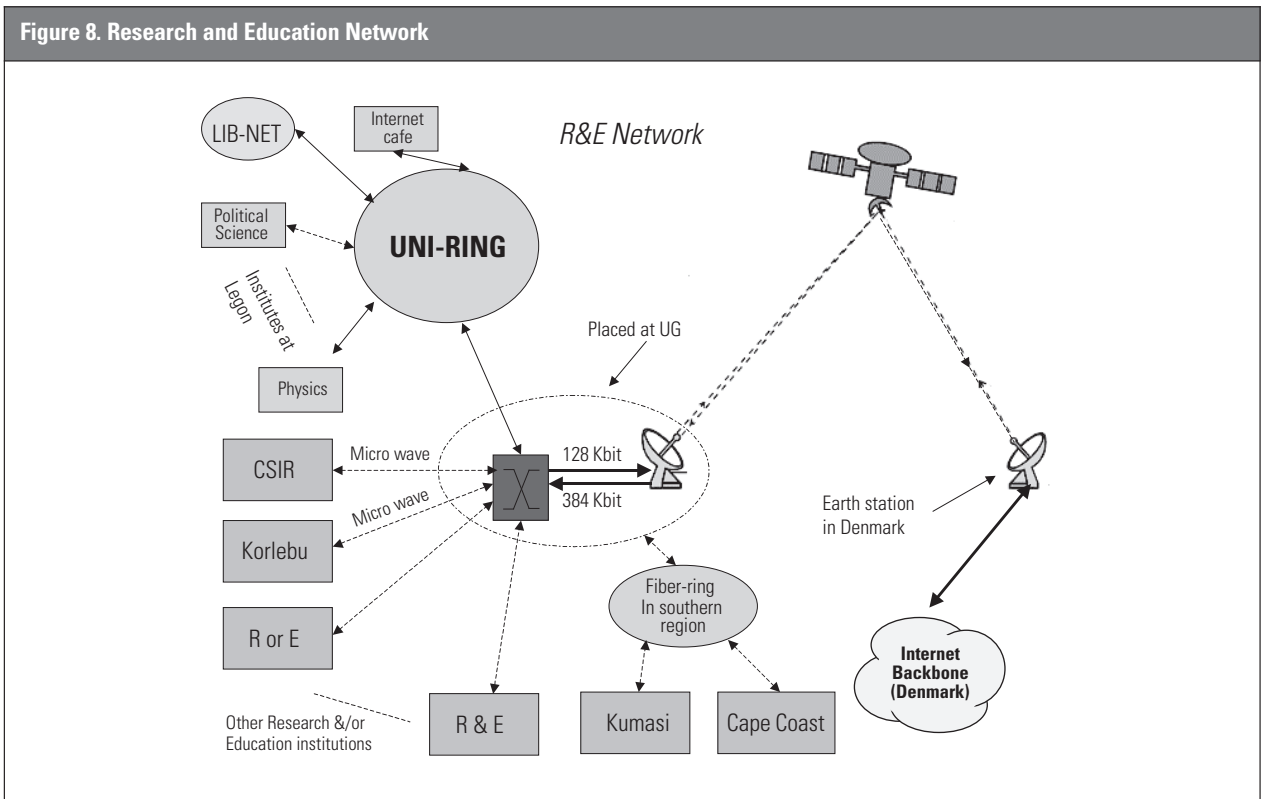
between the two solutions: the Library Network use was based on an almost free technology, whereas the cost of a fibre connection is very high.

2.3.2 Organisation

A precondition for the projects was their ability to demonstrate long-term financial self-sustainability. The organisational aspect of this was addressed by establishing an independent organisational structure to ensure that different interests were addressed, the system was maintained properly, and that proper procedures were in place, e.g. for efficient and transparent cashing-in of contributions, etc. The structure was composed of three functions: a supervisory function, technical management and financial management.

The supervisory function was performed by the board of the network, which includes representatives from the participating institutions. The board should decide upon conditions for participation, price policy, etc. and supervise that the organisation was actually run in accordance with these conditions.

The technical management performed maintenance, expansion and upgrading of the system and *the financial management* took responsibility for financial functioning of the organisation including timely collection of contributions.



Box 2. Network performance and capacity needs

Although the VSAT and improved network infrastructure radically increased the capabilities of the network, from a user point of view it was difficult to see all these improvements. An investigation was undertaken to determine the reasons for this and it was concluded that they were partly due to problems in the daily organisation and use of the network.

The VSAT connection to Denmark worked properly. Regular measurements of the gateway router showed that the connection speed was high before and after working hours, indicating that the lower performance of the network during the day was due to congestion on the network. Analysis indicated that the likely reasons for congestion were basically:

1. An increased number of devices connected to the network during working hours. For example, at the beginning of the project there was only one PC connected to the network in the Balme Library. Soon after a computer lab with 25 Internet enabled PCs was established and during a two-to-three year period this number increased to 150 PCs, which were used intensively;
2. Some of the devices connected to the network generate noise traffic; and

3. The structure of the network was identified as inadequate, requiring redesign.

Based on the analysis some guidelines were devised for improving both capacity and security:

- All PCs connected to the network should have an anti-virus program installed;
- Any PC generating noise traffic should immediately be taken off the network;
- There should be control over the number of devices connected to the network;
- There should be control over how Internet services are used. There should be rules regarding limits to acceptability for using the network to access non-relevant materials and services;
- Mail servers should function properly so that users are not forced to use web-based mail applications such as Hotmail, Yahoo, etc.; and
- A firewall was identified as an important requirement for the network.

2.4 Challenges and lessons learned

2.4.1 Regulatory, technical and organisational barriers

The major regulatory barrier was the frequency assignment process for the licensed bands of the radio spectrum, i.e., HF and VHF. Microwave solutions are based on the WLAN, 2.4 GHz, which are accessible without any licence all over the world.

One of the reasons for the slow assignment process for getting HF and VHF licences was that the application we wanted to use was new. HF and VHF are mainly used for voice communication, either in the broadcast sector or in the communication sector like in the professional mobile radio sector. Using the spectrum to offer Internet connection to the remote universities was new and unknown. Another and more practical problem was that the formal users (the management of the University of Ghana and other universities) did not give the project high priority and did not allocate the necessary effort to put pressure on the frequency board. There were several reasons for this lack of enthusiasm on the user side. One of the main parameters was, however, that the HF-solution was seen as 'low-tech' compared to, e.g., a modern connection, and the users looked from the beginning for other solutions with higher capacity.

Another regulatory barrier was obtaining a licence to operate a VSAT connection. VSAT operations were only allowed to be undertaken by the incumbent telecom operator, Ghana Telecom, and the alternative general licensed tele-operator,

WESTEL. This problem was quickly resolved by the University of Ghana's successfully arguing that the VSAT would be used for education and research purposes.

A specific technical problem was that introduced technologies were immature and therefore needed a relatively longer implementation time – especially the HF-solution that was developed for the project.

Lack of qualified staff was an overall challenge at the beginning of the project. This included both lack of trained technical personnel and the lack of organisational experience and it was addressed by intense training activity at different levels and by constructing an adequate organisation (see section 2.3.2).

2.4.2 Assessment of the deployed technologies

HF LINK

The HF link has very interesting characteristics. It is possible to establish connectivity over long distances without any repeaters. Compared to the other technology that also enables connection over long distances, especially satellite, it is much cheaper.

The link capacity is low (2.4 Kbit/s) but because there is (almost) no connection cost involved, it is a very good solution where other infrastructures do not exist, where cost is an essential parameter and the only other possibility is a satellite link.

To make HF work efficiently, the necessary frequencies must be assigned to the use. The characteristics of the HF fre-

quencies change through the day and night time. The equipment/use should be assigned several frequencies so it can shift between different frequencies and choose the best one.

The HF link has been the least appreciated link in the library project. From the beginning, the sites with HF connection looked at possibilities for establishing more modern connections and there was little willingness to adapt to the characteristics of this technology: the slow, but stable and very cheap connection. A related and self-fulfilling problem was the above mentioned slow frequency assignment process that implied that the solution was given 'test frequencies' that suffered from interference and resulted in occasional malfunction.

VHF LINK

Using VHF frequencies we established a link with a capacity of 33 kbit/s over a distance of about 60 kilometres. VHF was a cost efficient technology for this level of distance and the capacity was at an acceptable level, especially bearing in mind that connection to the Internet backbone for a long time was 384 kbit/s.

The link was used regularly, but suffered from long down-periods due a combination of power problems and lack of technical staff.

MICROWAVE LINK

Microwave connections are truly high speed connections and they have been stable and very much used. Independent from the projects discussed here, other institutions have been connected to the network using this technology. The technology is a point-to-point WLAN connection using frequencies free for this type of use by international agreement thereby avoiding the process of specific frequency assignment.

VSAT

VSAT was a well-established technology and it has also in relation to our projects been a reliable connection to the Internet backbone. From the start of the REN project the connection was an asymmetrical 384/128 kbit per second connection and it was later upgraded to a 1 Mbit/512 kbit connection (and the technology platform was shifted from C-band to Ku-band).

3. Broader implications

We have not undertaken a comprehensive study to evaluate the full implications of the projects. However, smaller surveys and completely new library activities provide evidence that establishing Internet connectivity to the University of Ghana and the remote universities rather quickly changed study and work procedures. It has established a more modern platform for communication between researchers and given the students and researchers a powerful tool to gain information from the outside world. This must be seen in the context that the level of access to international research information was very

low in Ghana – as in most developing countries – and access to the Internet radically changes this.

Indications for implications of Internet use as a communication and information medium include the following:

- The number of requests for articles grew and reached a significant level (the aim of the inter-lending activity of the IFLA-project).
- The use of PCs increased rather quickly after the introduction of Internet access – especially among students, but also among faculty.
- The number of PCs connected to the network rapidly increased both in terms of individual PCs and computer labs connected. The success implied that the system was overburdened and connections experienced by users as very slow. The growth in the number of connected PCs out-paced increases in connectivity capacity during the project period. This exposed a lack of efficiency at the organisational level.
- The network traffic was monitored and revealed full (over) use of the resources from early morning until midnight.
- Access to international scientific databases via a combination of CD-ROMs and Internet access radically altered the more general connection of students and teachers to the international academic community and gradually made inter-lending superfluous.

4. Conclusion and future perspectives

In this chapter the establishment of Internet access in Ghana and the creation of a Ghanaian Research and Education Network are described and the drivers, barriers and implications of the project are analysed.

A key finding is that even low cost projects can engender major changes in research and education environments in developing countries. A bottom-up approach to information society development is relevant. The introduction of modern, networked, electronic tools, even in environments with weak or nonexistent infrastructure and lack of human resources, has been illustrated as economically feasible. The Ghana case described in this chapter was initiated as a trial project. Funding for formal evaluation of to what extent the results and experiences from this case are applicable to other environments in other countries has not yet been provided, but a lot of positive implications have emerged – both directly for education and research and indirectly for new industry-university links. Some of the solutions are being transferred to other countries.

Regarding specific local access solutions, the performance of microwave especially, but also VHF connections, were appreciated by the users as adequate. The HF solution, compared to other technologies, has the advantage of end-to-end

connections between sites of 600 kilometres (and more) distances without any repeaters. The fundamental weakness is that it is a very slow connection, but it may be used to send email and also to browse Internet pages – especially if images and other fancy content are disabled. This leads to the general conclusion that the relevance of solutions for electronic communication is not only a technical issue. A given technology enables certain tasks. Whether these are relevant in a given environment are political and administrative issues. The HF solution in Ghana delivered Internet access to places without functioning telephony and was as such a major leap forward, but was rejected as too low-tech based not on its performance, but on technological prestige. This is illustrated in terms of the experience in which two of the sites were able to use the prestige argument as an incentive to fund more advanced solutions whereas a third site did not manage not and at the time of writing is still without any Internet access.

The VSAT solution has proven efficient for connection to the Internet backbone in places lacking fibre access, despite its cost. The relation between cost and capacity calls for an organisational solution in which several institutions go together, for example, as did the European Research and Educational Networks (RENs), a key strategy for development of ICT –with respect to both technology and usage. This was targeted with the construction of a Ghanaian REN involving key institutions. The organisational set-up proved too weak, however, to cater for all essential interests. Being based at the dominant academic institution, the others concluded that too little attention was paid to them. An important point here is that the REN itself was under-resourced and failed to convince the management of the universities of its importance – both to them and the national development of ICT.

The practical results illustrate that important short-term results are attainable if the overall information society policy is coordinated and connected with targeted bottom-up approaches. Further, to realise potential impact it is important that these connections are both acknowledged and appreciated.

Notes

¹The work discussed in this chapter was organised across two projects, the Technology Assessment Project (TAP), sponsored by the Danish International Development Assistance Program (Danida); and the Interlibrary Lending and Document Delivery in Developing Countries project, sponsored by the International Federation of Library Associations and Institutions (IFLA) and Danida.

² See: <<http://www.ashesi.org/GHANA>>.

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Section 3

Regulatory and Information Practices

Regulatory institutions are charged with effectively balancing the demands of different stakeholders. Thus, effective regulation requires participation by all stakeholders in regulatory processes. In turn, effective participation in regulatory and policy formulation and decision-making implies that stakeholders have the necessary information to be able to make informed choices and demands. Good regulatory practices are not created in a vacuum, but evolve and respond to existing local needs and conditions – which are made evident by the participation of stakeholders. Especially in a post-privatisation context, the telecom regulatory environment is a constantly changing and evolving terrain. Regulatory information and communication practices are key to assessing the progress, innovation and telecom development efforts at a national level.

This section begins with a focus on information provision practices and communication with stakeholders, including consumer and pro-poor policy advocates, and is concerned with the processes and conditions affecting how informed and effective participation is encouraged. Because of new technologies, it is increasingly possible to broaden participation in the regulatory process, enabling a more inclusive range of contributions via different forums to discussions of priorities and strategies to achieve the goals set within national ICT policy frameworks. Further, given of the importance of ICTs to national economies and to local poverty reduction, the participation of those who stand to benefit from new opportunities will encourage sustainable infrastructure solutions.

Chapters 10 and 11 are assessments of national regulatory authorities (NRA) communication and information practices. **Chanuka Wattedgama** provides a ranking for Asian regulatory websites. NRA websites (ideally) serve as an information gateway for the sector's stakeholders – providing information about regulatory processes and procedures. Regulatory agencies can signal their independence and accountability, and, via its website, can make the same information available to all players, including: the private sector, investors, researchers, citizens, and consumer groups. **Gustavo Gómez & Amy Mahan**, via a case study on URSEC the Uruguayan regulator, examine the regulator's relationship with civil society.

The private sector stakeholder group has the most clear relationship with the regulator, simply because its ongoing activities are the primary object of regulatory scrutiny and oversight. Thus, it is not surprising that regulatory authorities often have a good range of information, services and applications to facilitate conducting telecom business in the country. However, despite this apparent trend of providing clear information for business activities, an investor with two billion dollars to spend is likely to obtain telecom sector intelligence from a number of sources, probably not relying only on the regulatory authorities' website – if at all. Conversely, a consumer with, for example, an unexplained 20% price increase is likely to use this service to obtain information about their situation and procedures for its correction. Ensuring a level playing field for all service providers implies enforcing market conditions to eliminate unfair competition. Excessive pricing or substan-

standard service provision in addition to harming consumers also confers advantages over service providers who play by the rules and make necessary infrastructure service investments and adhere to set pricing guidelines.

The next three chapters assess regulatory frameworks and their role in shaping the telecom sector. **Andrew Barendse** (Chapter 12) describes the emergence of regional organisations of telecom regulators as a regional market reform initiative, and provides a case study of the Organisation of Eastern Caribbean States. The chapter describes and assesses the early experiences of regional regulation as a new institution in the ongoing reform of the telecom sector and assesses its implications for regulatory effectiveness and sector performance. While reform of national and international markets has been underway for more than a quarter century, the emergence of these new institutional structures as mechanisms of regional coordination and policy implementation is a more recent phenomenon and has received relatively little attention in terms of understanding its contribution to the overall picture of telecom governance.

In Chapter 13, **Ewan Sutherland** examines the level of concentration in Africa's mobile telephony markets. While the mobile sector has enjoyed considerable investment and profits, the author argues that it is not clear that there is real competition. The high levels of concentration in the markets resulting from the staged introduction of additional operators is generally justified on the grounds of avoiding turmoil in the markets, managing spectrum allocation, and reducing

required investment in base stations. Sutherland surveys the key multi-national players on the African continent and argues that regulatory attention now warrants a shift towards a more pro-competitive market environment.

Chapter 14 is a case study of Guyana's telecom sector, using the telecom regulatory environment (TRE) methodology. **Samuel Braithwaite's** study focuses on the period following the privatisation of the government owned and controlled Guyana Telecommunications Corporation (GTC) and the establishment of the Guyana Telephone and Telegraph Company (GT&T). The newly privatised company was given a 20-year monopoly (excluding the mobile sector) with the option of renewal for a further 20 years. To date, GT&T remains the dominant service provider alongside two functioning mobile service providers. The privatisation of GTC was complemented by the establishment of the Guyana Public Utilities Commission (PUC), a government agency responsible for the regulation of all public utilities. In addition to the PUC, the regulatory environment also consists of the National Frequency Management Unit (NFMU), and telecom law provides for the office of the Director of Telecommunications, an office that has never been occupied. The main issue of concern in the mobile sector is interconnection. However, there is a lack of clear and detailed rules regarding regulation. This case study highlights fundamental problems plaguing Guyana's telecom sector at a time when telecom sectors around the world are moving towards increased competition.

Benchmarking National Telecom Regulatory Authority Websites of the Asia-Pacific Region

Chanuka Wategama

1. Introduction

1.1 E-government as an NRA delivery channel

E-government is significantly different from the traditional model of government. In contrast to how government services have been delivered for centuries, government agencies of today are expected to deliver information or services through electronic means, at any given place, around the clock, often with some form of value-added. In this model, a government is expected to incorporate all three types of interactions, namely government to citizen (G2C), government to industry or business (G2B) and inter-governmental dealings, also known as government to government (G2G), into a single mechanism. By leveraging the Internet economy, governments in the developed world as well as the developing world are now busy transforming these three relationships by providing universal, anytime-anywhere access to all government information and services.

A website¹ of any government agency is a fundamental window for realising the true spirit of e-government. A properly built website provides citizens and other stakeholders with one of the best interfaces to the agency. It allows for self-service, whether a citizen is searching for a particular piece of information, effecting a transaction or obtaining a copy of a certificate. It is available around the clock and does not require users to waste time in queues. Further, firms can search for opportunities with government, find data and even apply for certain facilities online. In short, a website is a virtual representation of the entire organisation in cyberspace.

The next step in the e-government ladder is the virtual organisation. In this model, the website is much more than yet another window of an organisation. Basically, the website itself becomes the organisation. It is immaterial to the stakeholders

where the organisation is physically located. Stakeholders, particularly the general public, do not have to physically visit the organisation. Instead, they interact with it electronically. So the website of an organisation – or in broader terms, whatever the form of its Internet presence in future – becomes the nucleus of an organisation that binds the rest of the stakeholders together.

As Mahan correctly identifies, the importance of a national telecommunication regulatory authority website cannot be underestimated (Mahan 2005). A national regulatory authority (NRA) is one of the key government agencies in any country. It is the apex body that is largely responsible for the healthy growth of the telecom sector and the diffusion of telecom services to the public at all levels. The NRA serves a large group of stakeholders varying from citizens to businesses and prospective investors to incumbent telecom operators. The website of an NRA serves as an information gateway to all these interested parties.

In addition to serving as an instrument for attaining transparency and accountability objectives, a well designed and informative website can also demonstrate the extent and facility with which the NRA uses the technologies and services it regulates. A well maintained website increases confidence in the regulator's skills and capacities. Moreover, an effectively run website with useful, up-to-date information and functionality can be an effective communication tool that not only speeds up communication, but decreases time and costs incurred for regulatory compliance (Mahan 2005).

1.2 Benchmarking of e-government initiatives

Return on investment is not necessarily a prime objective when e-government projects are conceived. Sometimes e-government projects are driven by objectives to achieve opera-

tional efficiency and effectiveness in service delivery. Likewise, financial constraints are common in government, hence there is an increasing demand to re-examine spending priorities. E-government programmes are subject to scrutiny to ascertain whether they deliver promised payoffs. Such situations call for detailed evaluation of the e-government efforts.

Three specific kinds of situations have been identified as environments that benefit from evaluation of e-government initiatives. The first is the e-readiness assessment of states or a given region. The second is evaluating the performance of a specific e-government programme or project and the third is the overall impact of e-government on general government functioning, economic development and services to the citizen (Gupta et al. 2004).

2. Methodology

2.1 Previous initiatives on parallel lines

For its methodology and structure, this web survey has been largely guided by two parallel previous studies:

1. United Nations Division for Public Economics and Public Administration (UNDPEPA) and American Society for Public Administration (ASPA) (2001) *Benchmarking E-government: A Global Perspective – Assessing the Progress of the UN Member States*, final report authored by Stephen A. Ronaghan (referred to as the ‘UN study’).
2. The World Dialogue on Regulation for Network Economies (WDR) (2005) *Benchmark Indicators for African NRA Websites* conducted by Amy Mahan (referred to as the ‘WDR study’).

The goal of the UN study was to objectively present facts and conclusions that define a country’s e-government environment and demonstrate its capacity to sustain online development. This was accomplished by a comparative analysis of fundamental ICT indicators and critical human capital measures for each UN Member State. An important outcome of this study was the final measure or E-Government Index, which could be a useful tool for policy-planners.

In determining what defines an enabling environment, this report has analysed critical factors by benchmarking the core areas endemic to national e-government programmes. The final measure, the E-Government Index, attempts to objectively quantify these factors and establish a reference point by which a country can measure future progress. The E-Government Index presents a more inclusive and less subjective measure of a country’s e-government environment. It incorporates a country’s official online presence, evaluates its telecoms infrastructure and assesses its human development capacity.

On the other hand, the WDR study, which is more relevant to this web survey, benchmarks websites of independent national regulatory authorities of 22 African states. This study has grown out of a collection of regional preliminary surveys

examining the extent to which NRAs were using websites to inform and communicate with the public – including citizens, businesses and other governmental and non-governmental organisations. The WDR study also tests and introduces a new indicator for ranking NRA websites. This measurement is an attempt to capture the incidence of different aspects that are important for NRA web presence.

Mahan acknowledges that a website presence indicator for NRAs cannot capture overall effectiveness, efficiency or transparency of the regulator. What the benchmarking process does attempt to do, however, is to clarify categories of information and their respective users, and to indicate responsiveness and interactivity in providing information.

The UN study classifies all governmental services under one of three fundamental categories: informational, interactive and transactional.

The first, informational, is by far the most significant. Information is at the heart of every policy decision, response, activity, initiative, interaction and transaction between government and citizens, government and businesses and among governments themselves. Thus how an e-government website presents information is a significant indicator of its effectiveness.

Because services are the public face of government, another primary objective of all e-government websites is to provide the citizen user with an efficient alternative medium for interacting with public sector service providers. This is generally accomplished by improving the flow of information both externally (G2C and G2B) and internally (G2G).

Finally, e-government websites are expected to provide transactional services and reduce inconveniences of receiving the same services in the traditional manner. At the transactional presence level, a country fully demonstrates the capacity for users to interact with the government by purchasing publications or other items, or utilising a service such as for obtaining a passport and paying online with a credit card, bank debit or some other electronic means. However, only a handful of nations have reached this level. The UN study names 17 such countries.

The WDR study places emphasis on the provision of information services. From the NRAs and its stakeholders’ perspective, this is likely to be the most important service provided by an NRA site. This web survey followed the same approach.

This web survey of Asia Pacific countries initially planned to use the following definitions to measure the e-readiness of different nations introduced by the UN study and modified in the WDR study to suit NRA sites:

- **Emerging:** Only basic and largely static information is available.
- **Enhanced:** Content and information is updated regularly, and information is available not only in its original format (such as acts and legislation) but is also explained and digested.

- **Interactive:** Users can download forms, contact officials and make requests. Available information has further value-added, such as being hyper-linked to relevant legislation.
- **Transactional:** Users can submit forms online – for example to request information, or to submit a request for a licence.

However, during the web research it became apparent that:

- a) Not all Asia Pacific NRA websites considered can be termed under one of these categories. The boundaries were somewhat vague. For example there were many sites that could be placed in an overlapping zone.
- b) This was not the only approach that could be used to evaluate the effectiveness or usefulness of an NRA website. For instance, an NRA website that is still in what is termed the 'enhanced stage' can be more effective or useful to its stakeholders than another website in the 'interactive' or 'transactional' stage.

Therefore, it was later decided not to use this general qualitative classification to rank the NRA websites. A more comprehensive and quantitative scheme has been used for this study.

2.2 Selection of countries

While selecting the national regulatory authorities for this study, every effort has been taken to include the maximum number of countries in the Asia Pacific region and to select a group of countries representing:

- every sub-region in the Asia Pacific (East Asia, South East Asia, South Asia, Pacific, Central Asia and Middle East);
- countries at different levels of development; and
- countries at different levels in their human development achievements.

However, the selected group might not be fully representative of all the categories, as the NRA information for some of these countries was not available, and in other cases NRAs did not have websites that were sufficiently developed as to be evaluated in this survey.

The method of selection was as follows:

- i) For the purpose of this survey, Asia was broadly defined as the group of countries in the region bordered by Russia, Turkey and Egypt and the Indian and Pacific oceans and the island nations of these oceans.² This group with the Pacific countries formed the first list of countries and included 62 different independent territories. UN recognition was used as the criterion for a country being considered an independent territory.
- ii) Each of the 62 countries was then checked at the International Telecommunication Union website for information about their telecom regulator information. If regulator

information for a given country was not available, that country was taken off the list.

- iii) At this stage, no effort was taken to determine whether NRAs were independent.³ This is due to the difficulty to draw a definitive line between 'independent' and 'not independent' NRAs. Secondly, and perhaps more important, is that this survey was not intended to evaluate the performance of the NRAs per se, but rather to evaluate the performance of the NRA websites. So even if some other government agency (usually a ministry) is engaged in carrying out the duties of an NRA, it was considered for the benchmarking purposes.⁴
- iv) All the remaining countries were checked for the availability of an NRA website. It was observed that many NRAs have not yet opted to have a web presence. In two cases, the available link did not work. In both cases, Google searches were conducted to find an alternative website, but were unsuccessful.
- v) Websites were then checked to ascertain whether they were sufficiently developed to evaluate them in a competitive survey. In some cases, Syria is a good example, the sites were still under construction and it would have been unfair to evaluate them at this stage. For other countries (especially where the NRA is not independent), websites were found to be too inadequate to be considered as NRA sites.⁵ These countries were eliminated from the list.
- vi) Finally, five NRAs websites were eliminated from the study because of practical difficulties. Armenia, China, Indonesia, Thailand and Yemen do not have English versions of their websites. These NRA websites were eliminated from the list purely due to the practical difficulty of evaluating them. It is not suggested that every country should have an English version of the website. South Korea does have an English version site, but it was clear this site was not be a comparable replica of the local language site, so it too was not considered for the evaluation.

As a result of this preliminary study, 27 NRAs were found to have websites, which could be evaluated. The complete results are shown in Annex 1.

2.3 Clustering of countries

For comparison purposes, clustering of countries was regarded as a useful strategy. Several ways of clustering the countries were considered. Table 1 illustrates the considered methods and why each one of them was eliminated.

Finally, it was decided to cluster the countries based on the e-readiness of the population as measured by the number of Internet users per every 1,000 in the population. This method presented a logical fit as it compares the e-readiness of an NRA against the e-readiness of the population it serves.

Four clusters were selected based on this information. For convenience, a logarithmic scale was used to designate the clusters. As illustrated in the figure in Annex 3, the 27 countries neatly fall into four categories.

2.4 Ranking sites

Any NRA has many different stakeholders. The website of an NRA should cater to the needs of all these stakeholders. The best way to evaluate and rank an NRA website is to consider it from the perspective of the different stakeholders and check whether it meets their expectations.

The four key stakeholder groups are:

- i) **Existing Industry Players** who need to maintain a close relationship with the regulator and for whom the website can be one of the best interactive windows they can use for this purpose. The NRA can also use the website to keep existing operators updated on the latest regulations and market trends.
- (ii) **Prospective Investors** – an NRA website is expected to present accurate business information sought by such parties. For international operators the website may be the best way to find regulatory information. The needed information

Method	Reasons for elimination
1. Geographic	If the countries were clustered according to the regions, some of the regions would have only a few countries (for example, only two countries in Central Asia met the requirement criteria). Countries within a region can have very different socio-economic conditions, implying less ground for meaningful comparison.
2. Per capita income of the countries	As clearly illustrated in the UNDP Human Development indices, country income is not directly correlated to living standards.
3. Based on the Human Development Index	Although a good indicator, it also does not provide a direct measure of a country's development.
4. Based on the UN e-Government Index	This would have indicated how each NRA is using web presence in providing services compared to other government organisations. However, there is little reason for using this method, because it is not usually required to compare the performance of NRA with the rest of government organisations. Moreover, there was concern that data from the 2001 study might be outdated.

may fall into different categories such as legal information like the Telecom Act, financial and technical statistics for the local market, relevant procedures – particularly licensing or existing interconnection agreements, and so forth.

A prospective investor will also be interested in the business and economic environment of the country. This information might be available through other websites and other channels, but a proactive NRA website is expected to provide the basic information on the business environment, or at least lead the investor to the other relevant sites through correct links.

Table 2. E-readiness of each country considered for the web survey

a	Country	Number of Internet users for every 1,000 in population
1	Afghanistan	1.5
2	Myanmar	1.5
3	Bangladesh	1.5
4	Cambodia	2.2
5	Nepal	3.4
6	Pakistan	10.3
7	Sri Lanka	10.6
8	Papua New Guinea	13.7
9	Bhutan	14.5
10	Georgia	14.9
11	India	15.9
12	Vietnam	18.5
13	Mongolia	20.6
14	Philippines	44.0
15	Maldives	53.4
16	Jordan	57.7
17	Saudi Arabia	64.6
18	Oman	70.9
19	Brunei Darussalam	102.3
20	Lebanon	117.1
21	Bahrain	245.6
22	Israel	301.4
23	UAE	313.2
24	Malaysia	319.7
25	Hong Kong	430.1
26	Australia	481.7
27	Singapore	504.4

Source: UNDP (2004).

- iii) **Consumers** use the NRA website from the end user perspective. An end user might want to know about the services available, perhaps about the new technologies and their reliability or the performance indicators of different service providers. The end users might also be interested in safeguarding their consumer rights and view the NRA website as a means for the same.
- iv) **Others** – a plethora of other indirect stakeholders such as the media, researchers, telecom students, etc., depend more on the NRA website for the latest telecom sector information than any other communication channel.

However, for practical reasons it is difficult to evaluate the NRA websites using this approach because some information is valid for more than one category of stakeholders. Thus, some attributes might be evaluated more than once. To avoid this duplication, it was necessary to slightly deviate from this approach. The following are the four types of information the WDR study anticipates to be present in an NRA site.

- **Factual information:** reports on key regulatory information such as the Telecom Act and statistical indicators.
- **Consumer and citizen information:** information of interest to end-users or prospective end-users about consumer information, universal service, consumer rights (and reporting abuses) and tariffs. In addition to actual legislation and formal guidelines, digested information such as clear explanations (for example of complaint procedures), and frequently asked questions (FAQs).
- **Business information:** relates to information needed by current and prospective operators and investors such as licensing procedures, technical requirements, interconnection agreements, online forms for certification, authorisation, etc. For this class of resources it is useful to have information which explains and describes procedures and requirements, rather than mere provision of access to formal documentation and legislation.

- **Telecom regulatory news and other features to further disseminate information:** this final category ensures accessibility of information, regulatory news and developments to researchers and journalists who can further disseminate regulatory information nationally and internationally. Often these features contextualise the site information and make it more intelligible.

In addition, there are general features that all NRA websites should have to make them more effective and useful to stakeholders. These general characteristics are not taken into specific consideration in the WDR study. This is likely because most of the African websites under consideration for that study were not developed to that stage. However, it was added in this web survey, especially after considering the recommendations Mahan offers to researchers of any future studies.

These are the general features against which the NRA websites are evaluated:

- i) **Availability of the mission statement of the NRA:** e-government websites should justify their existence. This ensures that visitors to the site are provided with a broad picture of the type of organisation and its responsibilities and activities – this is spelled out in the mission statement. Thus, it is essential that the entity's mission statement or an equivalent statement of role, responsibilities and authority be present.
- ii) **Future plans and long-term vision:** telecommunication, irrespective of the country considered, is a continuously and rapidly developing field. Therefore, it is essential for an NRA to have a long-term vision and objectives. Presentation of the same on the website cannot be termed as mandatory, but it is definitely useful for orienting stakeholders.
- iii) **Continuously updated information:** this is verified by checking the websites' updates (if that information is available) or by dates on news items and other entries. (Unfortunately, the short time span of this study did not allow repeating the survey to obtain better results.)
- iv) **Availability of information in local language(s):** this is relevant if the language(s) used by the citizens of a particular country is not English. The NRA websites are not expected to present every piece of information in local languages. However, it is expected that at least some form of local version should be available, if more than a significant percentage of the country's population (taken as 10% for this web survey) does not understand English.
- (v) **Links to external sites:** in this case, not only the presence, but also the relevance of the links is important. For example, an NRA site should direct investors to other websites that provide further information about the economic environment of the country. Checks are also made for broken links, as it is possible that in some cases they are not updated regularly.

Cluster No.	Countries	Log scale range
Cluster 1	Afghanistan, Myanmar, Bangladesh, Cambodia, Nepal	0 – 0.75
Cluster 2	Pakistan, Sri Lanka, Papua New Guinea, Bhutan, Georgia, India, Vietnam, Mongolia	0.75 – 1.5
Cluster 3	Philippines, Maldives, Jordan, Saudi Arabia, Oman, Brunei Darussalam, Lebanon,	1.5 – 2.25
Cluster 4	Bahrain, Israel, UAE, Malaysia, Hong Kong, Australia, Singapore	2.25 – 3

Note: Cluster 4 countries have the best e-readiness and cluster 1 have the lowest.

vi) **Ease of finding information** (separate links for different types of users on the home page or alternatively, a site map): it is important to ensure that different stakeholders will be able to obtain the information they seek, with minimum effort and without having to visit pages with information they do not need. As an e-government service provider an NRA is expected to structure its website in such a way that minimises visitors' search time.

vii) **Organisation charts and contact information:** a frequent difficulty is finding the names of the relevant person to contact within the organisation. It is essential for a website to present an organisational chart and/or officials' contact details. This will be of particular help to those searching for specific information from the NRA.

viii) **Availability of online forms:** making the different forms that the public and other stakeholders need to interact with the NRA available online can save much time and travel or

postal costs. Ideally the website should provide means to submit these application forms online, but only a handful of websites currently provide this kind of access.

ix) **Using the website to meet human resource (HR) requirements:** this is not an e-government service, but an NRA can use a website to fulfil its HR requirements in an effective, speedy and cost-effective manner. The job seekers who visit the website cannot be considered as a direct stakeholder, but the availability of this feature is recognised especially because it is important from the organisational point of view.

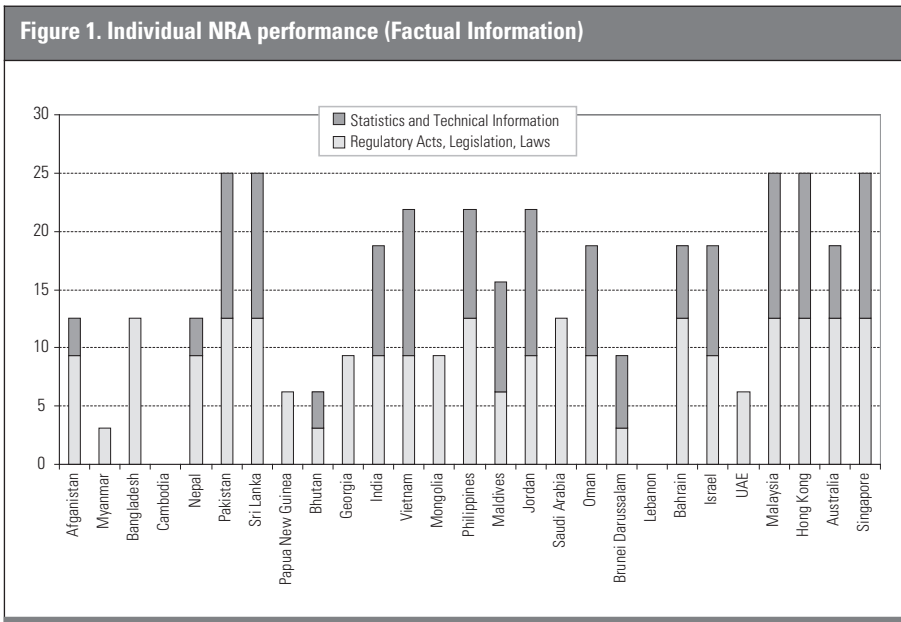
2.5 Marking Scheme

Table 4 illustrates the weighting for each category in the evaluation process.⁶

	Category	Category weight	Sub-category	Sub-category weight (within the category)	Final weight
1	Factual Information	25%	Regulatory acts, legislation, laws	50%	12.50%
			Statistics and technical information	50%	12.50%
2	Consumer and Citizen Information	25%	Information specially targeted to consumers (other than rights)	50%	12.50%
			Consumer rights information	25%	6.25%
			Consumer complaints process	25%	6.25%
3	Business Information	25%	Equipment certification	15%	3.75%
			Market entry details	15%	3.75%
			Interconnection information	15%	3.75%
			Consultancy papers	55%	13.75%
4	General	25%	Mission statement	8%	2.00%
			Future plans	8%	2.00%
			Updating	8%	2.00%
			Local languages	8%	2.00%
			Local links	8%	2.00%
			International links	8%	2.00%
			Ease of use	8%	2.00%
			Availability of online forms	8%	2.00%
			Organisation chart / contact details	8%	2.00%
			Information for job seekers	8%	2.00%
			Telecom news	20%	5.00%
	Total	100%			100.00%

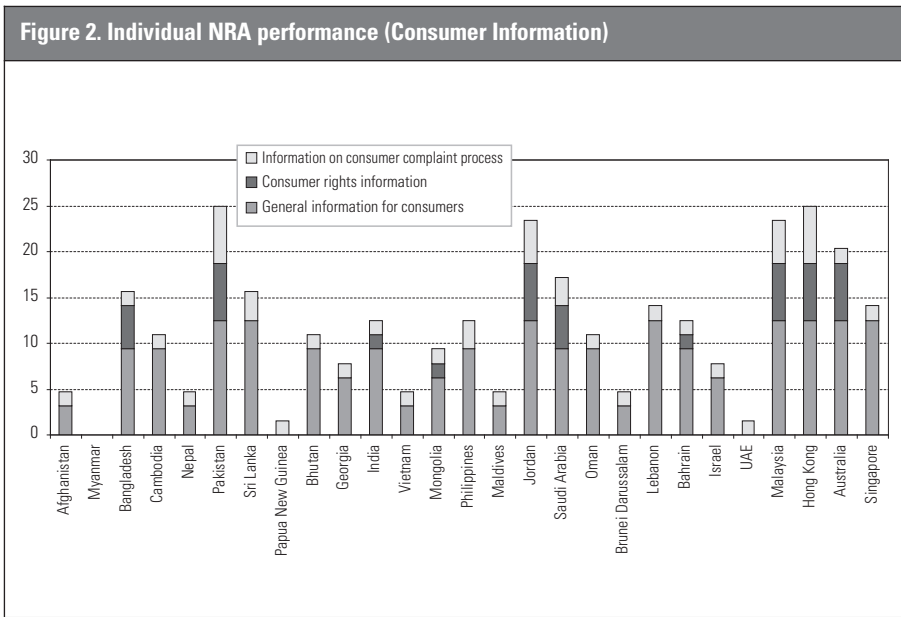
Note: In cases where the NRA is not responsible for some particular task (such as licensing, handling customer complaints, etc.) the marks were awarded only if the website linked to the website of the agency with the particular area of responsibility.

3. Results



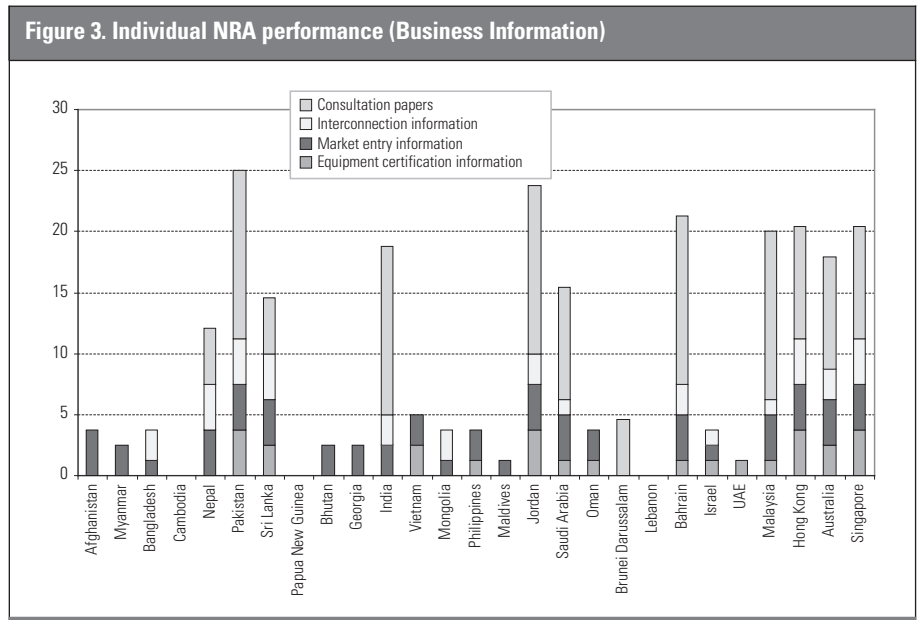
3.2 Consumer information

The objective of this section was to check how far a website caters to the needs of the end consumers. Special emphasis was given to see what type of consumer rights information is available and whether the NRA uses its website to facilitate the consumer complaint process.



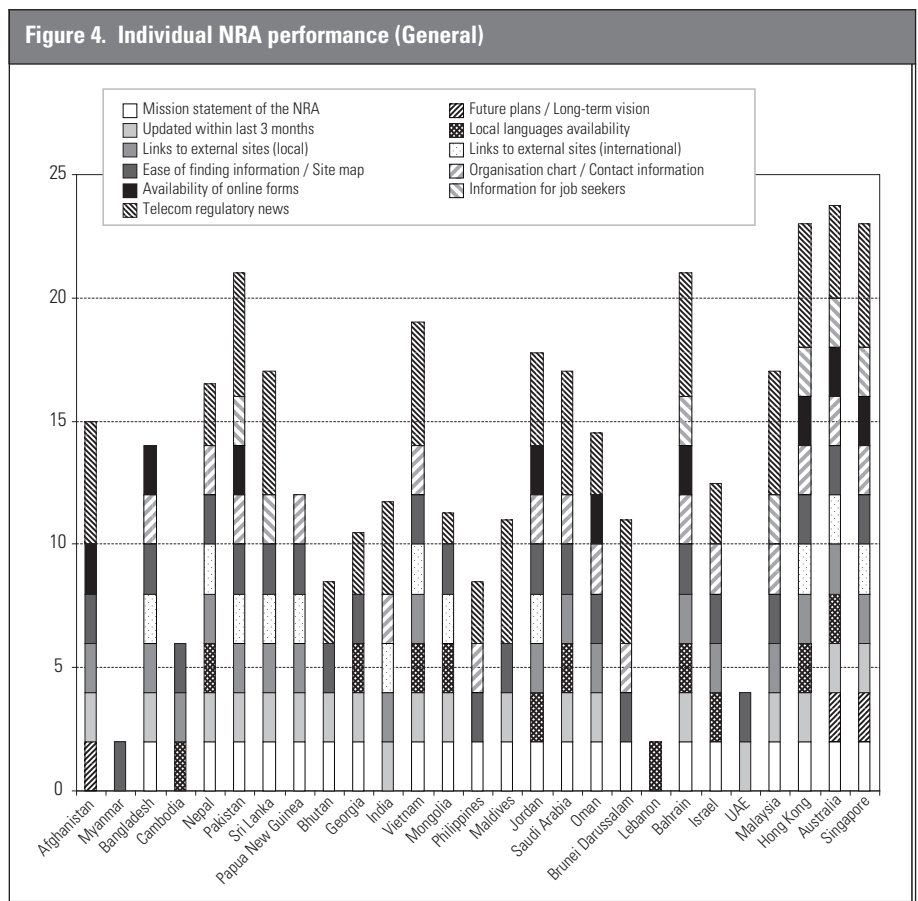
3.3 Business Information

This section deals with the information usually sought by business firms, such as procedures for obtaining permission to import telecom equipment, licensing procedures and charges, interconnection details. The availability of the online and off-line forms was also checked.



3.4 General Information

This section looks for the general features of the website as well as the availability of telecommunication news.



3.5 Final Analysis – Individual NRA performance

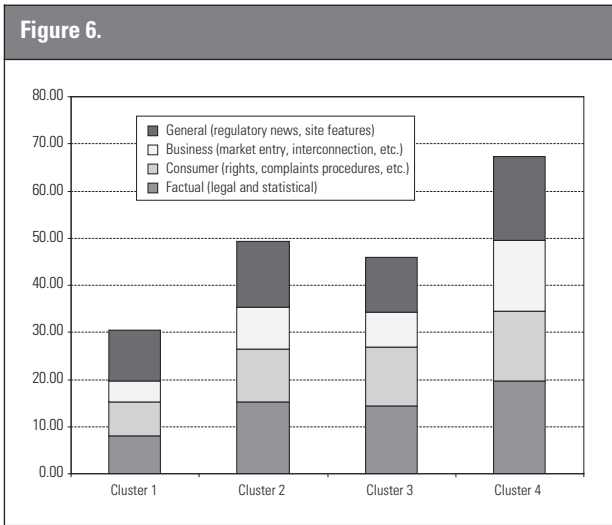
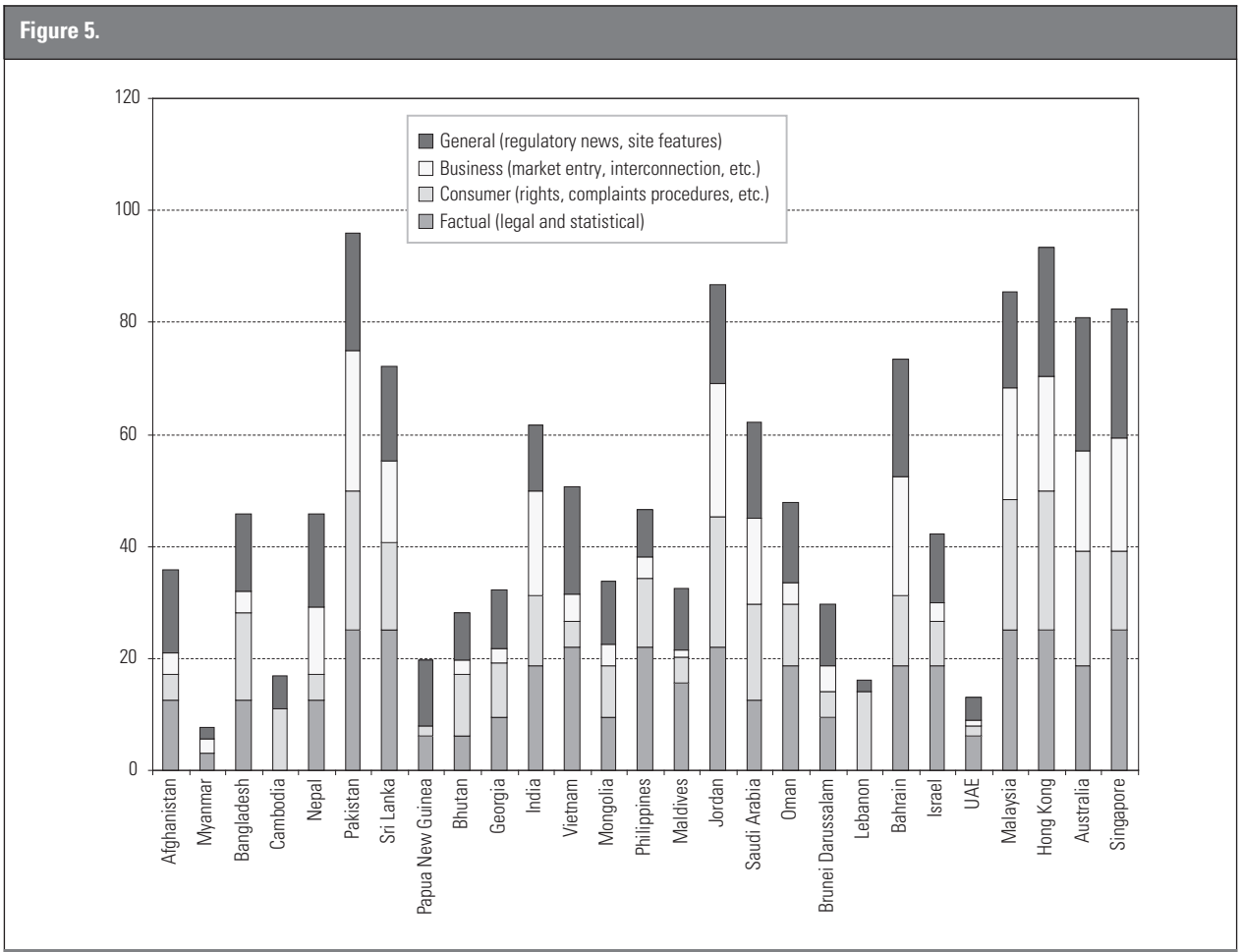


Table 5. Cluster Performance (Final)

	Cluster Average	NRAs at or above sector average	NRAs below sector average
Cluster 1	30.43	Afghanistan, Bangladesh, Nepal	Myanmar, Cambodia
Cluster 2	49.31	Pakistan, Sri Lanka, Vietnam, India	Papua New Guinea, Bhutan, Georgia, Mongolia
Cluster 3	45.97	Jordan, Saudi Arabia, Oman	Maldives, Brunei Darussalam, Lebanon, Philippines,
Cluster 4	67.28	Bahrain, Malaysia, Hong Kong, Australia, Singapore	Israel, UAE

4. Limitations

This web survey is not a full-fledged e-government benchmarking study. It is more of a 'benchmarking of web presence by NRAs on catering to the demand of selected stakeholders'. These limitations are clear when the methodology used in this survey (which is largely based on the methodology used in the WDR study) is compared with the one used in the UN study.

The UN study uses several different approaches to develop the E-Government Index for each country. These include:

- i) A web survey to measure not only the effectiveness but also the progress as well in different types of e-government efforts;
- ii) Visits to selected countries to assess the progress of their e-government programmes;
- iii) A questionnaire to high-level policy and decision makers, public sector managers, administrators and civil servants working on their country's national e-government programmes; and
- iv) A statistical analysis to determine the infrastructure index (based on indicators such as the number of PCs, Internet hosts, Internet users, fixed telephone lines, mobile connections, and TVs for every 1,000 of the population of each country).

This web survey did not undertake the last three elements, largely due to a lack of resources to complete a benchmarking study of such a massive scope. Although restricted to the web survey (following the example provided by the WDR study), this work and its findings endorse and emphasise the need for a broader study to be completed in the future. (See Annex 1 for a brief description how this study compares with the UN and the WDR studies.)

There were a few other limitations that were unavoidable. These limitations were the result of inadvertent assumptions that although not always true, but without which the survey could not have been completed. In an ideal world, to effect a comparison, it is necessary to keep all other factors equal. This means the survey has inadvertently assumed that all economies covered by the 27 NRAs are equal, all NRAs are of equal size and have equal powers, and operate in similar markets. However, in the real world this is hardly the case. For instance, it might be easy for a relatively small state to have an effective NRA and effective website compared to a larger state. Also a richer nation might be in a better position to spend more on human and technical resources that are necessary to create and maintain an effective website. These dissimilarities are somewhat addressed by benchmarking the websites against the e-readiness of each country, but even that fails to address the issue completely.

The issue of local languages was also prominent. In some of the surveyed countries English is not often used for day-to-day activities. For such countries it might not be essential to have

all NRA information in English – such as the case of South Korea where it might not be viewed as a dire necessity to publish consumer information in English. However, due to practical difficulties, for this survey, only the English versions of websites could be benchmarked. Where there were no English versions, the countries were removed from the study. This limitation could be the possible reason for some countries like South Korea to score relatively low marks.

5. Conclusion

An immediate observation one might make here is the inadequacy of the number of websites that came under review. Of the 62 independent Asia Pacific economies, only 27 NRA websites (44%) have been benchmarked. The percentage of the sites that could have been benchmarked if not for the limitations of local languages is 53%. It can be argued that the situation is slightly better than for Africa where the WDR study reviewed only 44% of NRAs. However, it should also be noted that in Africa only 15% of the NRAs did not have functional websites, whereas for Asia, taking the number of websites under construction into account, this figure is 29%, or almost the double. In other words, three out of ten NRAs in the Asia Pacific region do not have a web presence. It might not be fair to attribute this purely to the lack of strategic direction at the top level, it may also be due to lack of resources or other problems, but nevertheless it does not make a good impression.

Another noteworthy observation is that a relatively higher number of websites do not have full-fledged English versions. It was found that five countries (Armenia, China, Indonesia, Thailand and Yemen) of the 62 considered do not have English versions of their websites at all, while South Korea has only a cut-down English version. In countries where only a minor percentage of the population speaks English and almost all can communicate in another language, perhaps the NRAs might have thought it was not necessary to have English versions of their sites. Or they might have faced difficulties in finding skilled people with adequate English knowledge for the task.

However, visitors to NRA websites are not just only consumers. There are many other stakeholders and some of them might be from outside the country and may not understand the local language(s). Therefore, it is worthwhile for NRAs to offer an English version of the website. In some cases it could be useful also to offer versions in other languages. However, the only websites reviewed that had versions of other international languages were Georgia and Mongolia, which had some parts of their sites in Russian.

Out of the 27 websites reviewed some presented only the basic information and had only ten or fewer pages (e.g. Myanmar, Cambodia and Lebanon). The other extreme was represented by effective and informative sites such as for Hong Kong, Pakistan, Australia, Singapore and Malaysia. These websites are not only informative, but also present information and other services in a user-friendly manner. In fact, these

websites can be recommended as guides to NRAs planning to build effective and useful websites of their own.

Following the standards set by the WDR study, this survey did not evaluate websites in terms of aesthetically pleasing features. However, the presentation of information was treated seriously as this is an aspect that makes a site largely useful. If the aesthetic aspects were considered, sites such as the ones of UAE and South Korea would have scored more than what they did in this survey. On the other hand, websites such as those of Australia and Singapore have apparently not taken excessive steps to make their pages aesthetically pleasing, but nevertheless information and had an excellent presentation. Sites of the NRAs of Hong Kong, Malaysia and Pakistan have attempted to strike a balance.

The survey also reviewed some of the non-independent NRA sites such as for Cambodia (Ministry of Posts and Telecommunications), Israel (Ministry of Communications), Lebanon (Ministry of Telecommunications), Myanmar (Posts and Telecommunications Department) and Vietnam (Ministry of Posts and Telematics). The structure of many of these sites was not very different from those of independent NRA websites. However, one may still argue that it is not fair to compare a ministry site with an independent NRA site given the fact that an independent NRA, with less bureaucracy and greater flexibility, is in a better position to present a more effective and useful website. The findings of the survey do not negate this supposition. Still, few ministry websites have fared very well.

It is useful to check what type of information the websites presented and what types they did not.

Overall, many sites were good at presenting factual information, including legal information. Of the 27 sites, 37% scored full marks for presenting legal information and regulations and 81% of them scored at least half of the marks given. Only 7% of the sites failed to have any sort of legal information. On the other hand, when it came to presenting statistics, the performance was not as good. Only 26% got full marks for presenting comprehensive statistics, while 56% received at least half of the marks. About 33% had no information regarding telecommunication statistics. In this section the second cluster beat the third one, and it is largely due to three sites in the Cluster 2 – Pakistan, India and Sri Lanka – presenting ample statistics about their local markets.

Availability of information directed at consumers was not very impressive (there is a possibility that in a few cases this information was presented in the local language versions only). About 30% of the websites got full marks for presenting information useful for consumers in a presentable format. Only 11% sites did not possess this information at all. However, when it came to presenting consumer rights, as many as 63% of the sites had no information for this area. Only 26% scored more than half of the marks in this sub category while only 19% scored full marks. Information about consumer complaint procedures also was not available on many of the websites. Of the 27 sites, 70% had only contact details or a feedback form to be used for consumer complaints. However, the 7% that scored

the full marks for this category have done well. The Hong Kong site provided not only the detailed procedures for making complaints and requesting investigations, but also information on the ongoing and completed cases. The Pakistan site also is worth a special mention. In addition to providing detailed information on the process of making complaints, the website provides information on the different types of complaints that consumers can make, whom to contact for different cases, toll free numbers for making complaints and information on the progress of previously made complaints. Complaints can be made using a user-friendly online feedback form. Overall, there is still enough room for improvement for most of the NRAs. Perhaps this is one area where they should pay more attention in future.

Except for information regarding licensing procedures and tariffs, many websites also lacked the information usually sought by the businesses. A total of 64% of the sites scored 2 out of 3 for the availability of the information on licensing procedures and tariffs. However, for information on restricted equipment and interconnection the corresponding percentages were 25% and 24%. Listing equipment that is prohibited to import is extremely useful information for any telecom operator. Given this list, operators can easily place orders without needing to first obtain customs clearance. Many sites presented the outcomes of consultancy studies they have undertaken the recent past. Some websites, such as for India's NRA, have a massive collection of consultancy papers.

For the category of general features, 78% of the websites either had posted either their mission statements or equivalent information. This is indeed a good sign and signals that a large percentage of NRAs were genuinely attempting to share the justification for their existence with stakeholders. Only 11% went a step further to sketch out their long-term visions or business plans. A minimum of 74% of the sites gave clear indications that they were updated within the last three months, while few sites were observed to be updated almost daily with the latest news.

One feature lacking on most of the websites were facilities to submit online applications. This is an extremely useful feature any website can offer to its stakeholders. This type of interactivity not only facilitates interaction between the NRA and its stakeholders, but also helps to get the website ranked under a more advanced category. Only 14% of the NRAs reviewed in this survey could be classified as 'transactional' as that was the percentage of sites that offered online forms for applying for a licence. Many other sites offered off-line application forms which could be downloaded from the site, but the submission must be sent by snail mail.

Presenting facts in local languages was not very impressive. In the vast majority of the Asia Pacific economies the official language or the language that is used most frequently is definitely not English. However, only 44% of the sites had taken steps to present local language versions of their websites. The countries that did not have local language NRA websites include Afghanistan, Bhutan, Brunei Darussalam, India,

Malaysia, Maldives, Myanmar, Philippines, Singapore and Sri Lanka. In some of these cases there could be difficulties in creating websites in local languages. Many websites linked to other relevant sites – 67% had links to local sites, in most of the cases government ministries and departments. Links to international sites (such as the ITU) were only found in 44% of websites. About 93% had site maps or similar means to ensure easy navigation. About 63% of the sites offer organisational charts; and 26% of the NRAs use their website as a means of recruitment. Many sites posted telecom news, however, in some cases the presentation was not too good. Some NRA sites presented information about the country (e.g. UAE) while others hosted picture galleries (e.g. Bhutan). These aspects were neither treated positively nor negatively in the evaluations.

Finally, the most important message this survey conveys is that most of the sites that scored lower marks could be improved with little effort. As clearly illustrated in the evaluation tables, NRA websites that were ranked higher scored well in almost all aspects, while those that were at the bottom end of the ranking failed in more than one aspect. Perhaps the lesson that most of the NRAs can learn is that instead of reinventing the wheel, they could get some good hints to improve the effectiveness of their sites from the websites of NRAs that were evaluated to be better. The five NRA sites that scored highest marks in the survey can be recommended as guides to the rest without the slightest hesitations.

Notes

¹ Sometimes the term 'web portal' is used to define this electronic window that offers all citizen services of a government agency, but this study prefers the less glamorous term 'website' because 'web portal' has other meanings in the computer literature.

² This is the same definition as is used by LIRNEasia.

³ This is an instance in which this study deviated from the WDR study, which only considered the websites of the 'independent' NRAs for the survey.

⁴ Some such agencies were later eliminated from the list, but for different reasons.

⁵ Japan, New Zealand and Tonga are the best examples. In these cases, the role of the NRAs is respectively played by the Telecommunications Bureau, the Ministry of Public Management, Home Affairs, Posts and Telecommunications of Japan, the Commerce Commission of New Zealand and the Prime Minister's Office of Tonga. Though these agencies were responsible for some of the duties of an NRA, it is not fair to evaluate their websites with the NRA websites.

⁶ One can always argue that this approach is subjective. Questions can be raised why this particular category is given this weightage and why not some other weightage. The author acknowledges the subjectivity of the approach. However, for the quantitative evaluation purposes, it is essential to have a sort of marking scheme, and this was adopted after consulting a group of professionals with wide knowledge on the subject. The weightages given to each category in the previous studies were taken into account.

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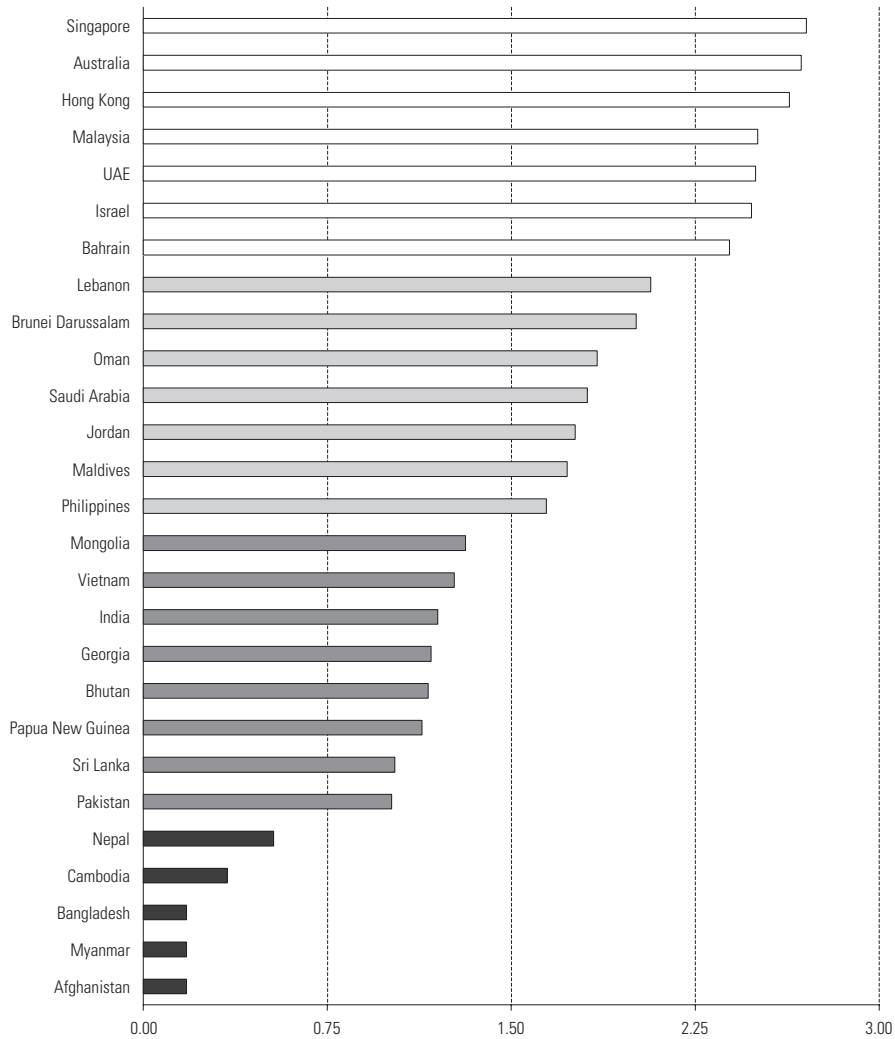
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Annex 1. Comparison of the intended web survey with two similar earlier efforts			
	Benchmarking E-government Report (UNDEPA & ASPA, 2001)	Benchmark Indicators for African NRA Websites (WDR, Mahan, 2005)	Asia Pacific NRA Web Survey
1. Objective	Benchmark countries on the progress of their e-government initiatives.	Benchmark NRA websites of the African countries for their effectiveness in providing services to their stakeholders	Benchmark NRA websites of the Asia Pacific countries for their effectiveness in providing services to their stakeholders
2. Scope	190 UN Member States	21 out of a total of 47 countries in the African region	27 out of a total of 62 countries in the Asia-Pacific region
3. Country selection criteria	If the country is a UN member state it is considered.	The country should have an NRA and the NRA should have a functioning website.	The country should have a NRA and the NRA should have a functioning website. (Apart from this, five countries were eliminated from the list because they do not have English versions of the sites. This was done due to the practical difficulty of evaluating non-English websites.)
4. Types of websites considered for survey	All e-government websites	Only NRA sites	Only NRA sites
5. Country clustering	The countries were grouped into eight clusters purely based on their geographical positions, to do a geographic regional analysis (North America, Europe, South America, Middle East, Asia/Oceania, Caribbean, Central America and Africa).	No clustering was done	The countries are clustered based on an e-readiness indicator of the respective communities. This is preferred over a geographical grouping, as it can also be used to compare the e-readiness of NRAs against the community it serves.
6. Types of services considered	Informational, interactive and transactional	All three were considered but given more emphasis to the informational services.	Follows the same approach used in the WDR study.
7. Methodology	Fourfold. Includes a web survey, face-to-face meetings with e-government experts and civil officers, a questionnaire and a statistical analysis to determine the infrastructure index.	Only a web survey	Only a web survey

Annex 2: Selection of countries for the intended NRA website survey – Full results (The countries that were not considered for the survey are highlighted)						
	Country	National Telecommunication Regulatory Authority	Regulator site	English version available? (Y / N / NA / UC)	Considered for survey? (Y / N)	If not reason
1	Afghanistan	Telecommunication Regulatory Board	http://www.trb.gov.af	Y	Y	
2	Armenia	Ministry of Transport and Communication	http://www.mtc.am	N	N	EVNA
3	Australia	Australian Communications Authority	http://internet.aca.gov.au	Y	Y	
4	Azerbaijan	Ministry of Communications	NWS	NA	N	NWS
5	Bahrain	Telecommunications Regulatory Authority	http://www.tra.org.bh	Y	Y	
6	Bangladesh	Bangladesh Telecommunication Regulatory Commission	http://www.btrc.gov.bd	Y	Y	
7	Bhutan	Bhutan Communications Authority	http://www.bca.gov.bt	Y	Y	
8	Brunei Darussalam	Authority for Info-communications Technology Industry of Brunei Darussalam (AiTi)	http://www.aiti.gov.bn	Y	Y	
9	Cambodia	Ministry of Posts and Telecommunications	http://www.mptc.gov.kh	Y	Y	
10	China	Ministry of Information Industry	http://www.mii.gov.cn	N	N	EVNA
11	Cook Islands	Information not available	NA	NA	N	RINA
12	Fiji	Telecommunication Unit	NWS	NA	N	NWS
13	Georgia	Georgian National Communications Commission	http://www.gncc.ge	Y	Y	
14	Hong Kong	Office of the Telecommunications Authority	http://www.ofta.gov.hk	Y	Y	
15	India	Telecom Regulatory Authority of India (TRAI)	http://www.trai.gov.in	Y	Y	
16	Indonesia	Badan Regulasi Telekomunikasi Indonesia (BRTI)	http://www.brti.or.id	N	N	EVNA
17	Iran	Ministry of Posts, Telegraph & Telephone	LDNW	NA	N	LDNW
18	Iraq	Ministry of Transport and Communications	NWS	NA	N	NWS
19	Israel	Ministry of Communications	http://www.moc.gov.il	Y	Y	
20	Japan	Telecommunications Bureau, Ministry of Public Management, Home Affairs, Posts and Telecommunications	http://www.soumu.go.jp	Y	N	NFFS
21	Jordan	Telecommunications Regulatory Commission (TRC)	http://www.trc.gov.jo	Y	Y	
22	Kazakhstan	Telecommunications and Post Department	NWS	NA	N	NWS
23	Kuwait	Ministry of Communications	NWS	NA	N	NWS
24	Kyrgyzstan	State Communications Agency	LDNW	NA	N	LDNW
25	Laos	Ministry of Communications, Transport, Post and Construction	NWS	NA	N	NWS
26	Lebanon	Ministry of Telecommunications	http://www.mpt.gov.lb	Y	Y	
27	Macau	Information not available	NA	NA	N	RINA
28	Malaysia	Malaysian Communications and Multimedia Commission	http://www.mcmc.gov.my	Y	Y	
29	Maldives	Telecommunications Authority of Maldives	www.tam.gov.mv	Y	Y	
30	Marshall Islands	Cabinet	NWS	NA	N	NWS
31	Mongolia	Communications Regulatory Commission	http://www.crc.gov.mn	Y	Y	
32	Myanmar	Posts and Telecommunications Department	http://www.mcpt.gov.mm/ptd	Y	Y	
33	Nauru	Directorate of Telecommunications	NWS	NA	N	RINA
34	Nepal	Nepal Telecommunications Authority	http://www.nta.gov.np	Y	Y	
35	New Zealand	Commerce Commission	http://www.comcom.govt.nz	Y	N	NFFS
36	Niue	Information not available	NA	NA	N	RINA

	Country	National Telecommunication Regulatory Authority	Regulator site	English version available? (Y / N / NA / UC)	Considered for survey? (Y / N)	If not reason
37	North Korea	Information not available	NA	NA	N	RINA
38	Oman	Telecommunication Regulatory Authority	http://www.tra.gov.om	Y	Y	
39	Pakistan	Pakistan Telecommunication Authority	http://www.pta.gov.pk	Y	Y	
40	Palau	Information not available	NA	NA	N	RINA
41	Papua New Guinea	Papua New Guinea Radiocommunications and Telecommunications Technical Authority (PANGTEL)	http://www.pangtel.gov.pg	Y	Y	
42	Philippines	National Telecommunications Commission	http://www.ntc.gov.ph	Y	Y	
43	Qatar	Supreme Council for Communication and Information Technology	NWS	NA	N	NWS
44	Samoa	Ministry of Post & Telecom	NWS	NA	N	NWS
45	Saudi Arabia	Communication and Information Technology Commission (CITC)	http://www.citc.gov.sa	Y	Y	
46	Singapore	Infocomm Development Authority of Singapore	http://www.ida.gov.sg	Y	Y	
47	Solomon Islands	Ministry of Transport, Works and Communications	NWS	NA	N	NWS
48	South Korea	Korea Communications Commission	http://www.kcc.go.kr	Y	N	EVNC
49	Sri Lanka	Telecommunications Regulatory Commission of Sri Lanka	http://www.trc.gov.lk	Y	Y	
50	Syria	Syrian Telecommunication Establishment (STE)	http://www.ste.net.sy	UC	N	UC
51	Taiwan	Information not available	NA	NA	N	RINA
52	Tajikistan	Ministry of Communications	NWS	NA	N	NWS
53	Thailand	Post and Telegraph Department	http://www.ntc.gov.ph	N	N	EVNA
54	Timor-Leste	Information not available	NA	NA	N	RINA
55	Tonga	Prime Minister's Office	http://pmo.gov.to	Y	N	NFFS
56	Turkmenistan	Ministry of Communications	NWS	NA	N	NWS
57	Tuvalu	Ministry of Works, Communication and Transport	NWS	NA	N	NWS
58	United Arab Emirates	Telecommunications Regulatory Authority (TRA) General Authority for Regulating the Telecommunications Sector	http://www.tra.ae	Y	Y	
59	Uzbekistan	Communication and Information Agency of Uzbekistan	NWS	NA	N	NWS
60	Vanuatu	Ministry for Public Works, Communications, Transport and Civil Works	NWS	NA	N	NWS
61	Vietnam	Ministry of Posts and Telematics	http://www.mpt.gov.vn	Y	Y	
62	Yemen	Ministry of Telecommunication & Information Technology	http://www.mtit.gov.ye	N	N	EVNA
				Abbreviations for table:		
				NA	Not applicable	
				RINA	Regulator information not available	
				NWS	No website	
				EVNA	English version not available	
				EVNC	English version not complete	
				LDNW	Link does not work	
				UC	Under construction	
				NFFS	Not a full-fledged NRA site	

Annex 3: Clustering of countries according to their e-readiness
 (Measured by the number of Internet users for every 1,000 in the population)



Selection criteria: Cluster 1: 0.00 – 0.75 in log scale
 Cluster 2: 0.75 – 1.50 in log scale
 Cluster 3: 1.50 – 2.25 in log scale
 Cluster 4: 2.25 – 3.00 in log scale

An Institutional and Practical Evaluation of URSEC – Uruguay’s Communication Regulator – and its Relationship with Citizens

Gustavo Gómez & Amy Mahan¹

1. Introduction

This study is about URSEC’s information practices. How well does the regulatory authority of Uruguay communicate about regulatory information and processes to different stakeholders? Can different stakeholders participate in these processes? Because our investigation illustrates regulatory communication could be more effective than they currently are practices – especially with consumers, users and citizens – this chapter also looks to how the role of the regulatory authority is evolving and could effectively evolve to better accommodate these stakeholders.

Relative to other countries in the region, Uruguay established a regulatory authority quite late. The consumer movements fomenting in Latin America during the 1990s in response to privatisation passed by Uruguay, where the consumer advocacy movement even now is weak and under resourced. Consumer defence practices in part are concerned with monitoring market conditions and negotiation on the consumer’s behalf when these are sub-optimal. During the wave of privatisation in the 1990s, consumer advocacy in the region was largely preoccupied with pricing of services in context of tariff rebalancing, which was the result of ending cross-subsidisation of service services that had allowed monopoly providers to offer lower prices. “Indeed, telecommunications generated greater numbers of official consumer complaints than any other sector in some Latin American countries in the 1990s” (Rhodes 2006). But not in Uruguay where the state monopoly ANTEL continued to efficiently provide fixed line services and sustain high teledensity rates. Hence, there was not the imperative of developing a sector devoted to protecting consumer rights because the state was already perceived as doing this.

However, with the advent of competition in mobile and other sectors, and given URSEC’s responsibilities around spectrum licensing for broadcasting, this chapter argues that there is an increasing need for improving URSEC’s communication practices in support of consumers, users and citizens. Further, as URSEC matures and the sector it regulates becomes increasingly concerned with market conditions, the regulatory authority should both cultivate and strengthen groups that are concerned with provision of broadcasting, telecom and ICT services. Additionally, with convergence and the emergence of new access technologies, the scope of advocacy in the ICT sector comprises an increasingly wider spectrum of issues. Civil society advocacy looks beyond individual consumer’s relationship with the market to a broader sphere of rights, including universal service, universal access, participation in policy and regulatory processes and decision-making, access to information, and communication rights.

New technologies increasingly afford greater participation in regulatory processes and facilitating a more inclusive discussion of priorities and strategies for defining the fixed goals of national ICT policy frameworks. Additionally, considering the importance of ICTs to national economies and to poverty reduction at the local level, the participation of the potential beneficiaries of these new opportunities will contribute to the formation of sustainable solutions.

From this perspective, there is a focus on two central themes: broadening the concept of stakeholder and identifying and evaluating corresponding mechanisms, both new and traditional, that can be marshalled to promote significant and productive participation by all stakeholders. Civil society and advocacy groups are natural allies of independent regulatory authorities in terms of the mission to promote conditions for

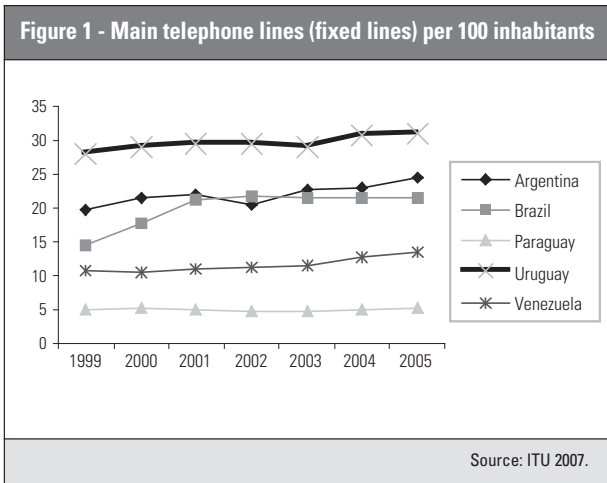
affordable access to the telecom network and services throughout all sectors of society.

This study was carried out with the goal of providing a perspective on these themes, as well as mechanisms for their inclusion in regulatory processes at a point in time when the Uruguayan regulatory authority is revising its communication strategy and practices. It has been undertaken within the framework of a cycle of studies that the World Dialogue on Regulation² has been conducting, focused on broadening participation in network development.

After a short five years of existence, URSEC has established four main areas of priority: advancing the democratisation of communication media; narrowing the digital divide; positioning URSEC as a recognised and respected institution; defending users and consumers. When considered as a whole, these priorities demonstrate a desire to transform URSEC into a more open and transparent institution, implicating a broader range of participants in its consultation and decision-making processes.

It is hoped that this study will contribute to this process by carrying out the initial steps of an evaluation of URSEC's communication practices and its relationship with citizens, and will also serve to promote transparent and inclusive regulatory practices. It is important to note that this study is based primarily upon a snapshot of an institution and its relationships taken in the second half of 2006, and should be considered within the broader process of institutional development, beginning with the creation of URSEC in 2001, continuing with the current transitional period which we hope will permit the regulator to overcome the deficiencies we have encountered.

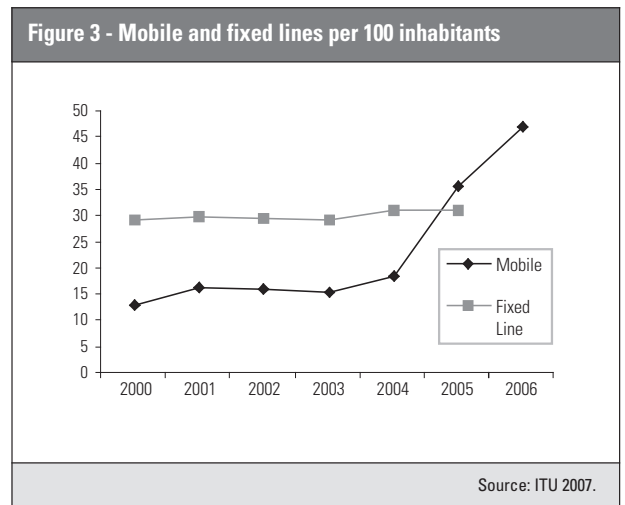
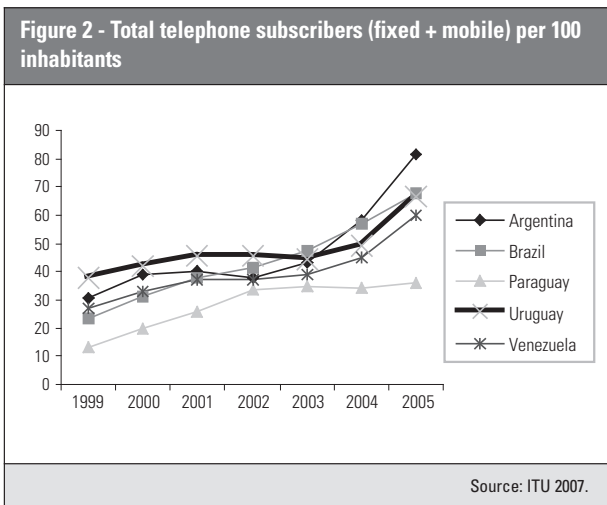
In order to present a complete understanding of this transitional process and the full context of our study, Section 8 of this paper briefly presents the measures which URSEC plans to implement during 2007. Many of these concern the areas examined here. In order to follow this period of transition and ascertain when these declarations have been transformed into concrete practices, it will be important to undertake a second follow-up study in 2008 to assess the implementation of URSEC's plans as have been outlined at the end of 2006.



1.1 Methodology

This is a preliminary and exploratory assessment of URSEC undertaken during late 2006. Our intention has been to investigate the state of URSEC's communication practices, in order to be able to make general recommendations as well as to identify further in-depth work that will need to be undertaken.

This assessment is based on in-depth interviews (see questionnaire in Annex 2) with representatives from URSEC, user groups and consumer advocacy groups (see Annex 1 for list of interviews); a website assessment; and review of documentation provided by the regulatory authority that is publicly available, as well as some internal documents that were made available for the purpose of this study.



Overall, we were guided by principles of best practice for regulators. These are institutional qualities that ensure that regulatory processes and decisions are reasonable, transparent and occur in an open, participatory environment.

2. A brief overview of telecoms in Uruguay

For readers unfamiliar with Uruguay, it is not a particularly difficult country in terms of terrain and the project of universal coverage. There are no mountain ranges, war zones, or particularly difficult places to reach. In fact, the entire country spans a mere 176,215 square kilometres, inhabited by three million people – about half of whom live in the capital city, Montevideo. But while Uruguay has enjoyed high teledensity relative to other countries in the region, new dynamics such as competition in mobile, emerging technologies, and the imperatives of the information society imply that new rules are being formed in the telecom and ICT sector, and that stakeholders need to be better informed about the sector, its regulation and how to participate in decision-making processes.

In February 2001, Law No. 17,296 was enacted, ending the state monopoly provision of telecom services and mandating the creation of URSEC – the national regulator for telecom and post. Thus privatisation came later to Uruguay than for most of the rest of the region, and nor was there a full opening of the market. The incumbent ANTEL would continue (as it does today) to provide fixed basic local telephony and the mobile sector, long distance and value-added services would be open to competition.

Uruguay is a bit of an anomaly. The persistent and endemic lassitude of over-staffed and ineffective under provision of state telecom that justified and drove privatisation initiatives in most countries was not the case in Uruguay. Monopoly provision of telecom services has been effective and the country

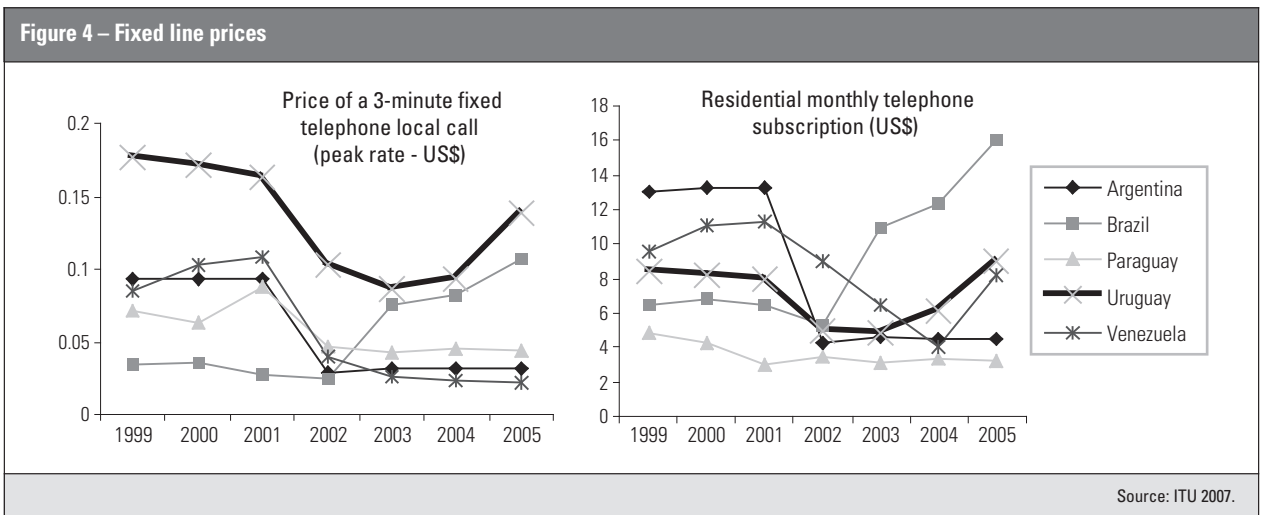
historically has had one of the highest rates of telecom penetration in Latin America with ANTEL being acknowledged as a reasonably efficient company.

The high teledensity rates, relative to the region, are shown in Figures 1 and 2. Across the region there has been stagnation in the fixed line segment of the market, with overall increase in teledensity being driven by mobile connections. Given the fixed line stagnation, the growth shown in Figure 2 is of course due to growth in the mobile sector – growth that continued during 2006 (see Figure 3) resulting in almost half of the population currently having a mobile phone. Hence, there occurred the now commonplace crossing of lines in Figure 3, of mobile connections surpassing fixed line ones. Prepaid mobile accounts for about 80% of subscriptions.

As shown in Figure 4, the cost of ubiquitous service provision and the fact of not introducing privatisation into the fixed line sector has been significantly higher prices for ANTEL subscribers. Rates were scheduled to be adjusted during 2007 with the introduction of a flat calling fee for the entire country, significantly reducing costs for subscribers outside of the capital city.

For the future, high fixed line penetration could explain in part higher rates of Internet access for Uruguay much before broadband connections were available (see Figure 5). This fixed line advantage could be significant as the country moves toward information society goals.

The point of this paper is not to argue for or against privatisation. However, there may be an argument that Uruguay's particular configuration of monopoly fixed line service provision with competition in mobile, will be a beneficial arrangement as the country moves toward information society goals and enjoys the advantages of previous investment in fixed line infrastructure. As shown in Figure 6, Uruguay already enjoys a strong regional ranking across information society indices.



The telecom terrain has been evolving into an ICT terrain, and ICTs offer a new level of opportunity for the country and they also engender new forms of participation in the market and social/political life. The next section considers the regulator's evolving role in this context.

3. Regulatory information practices

When regulatory authorities began to be established around the world during the 1990s, they were mandated with creating the conditions for a newly privatised telecom sector. This meant establishing market rules and technical frameworks. To a certain extent regulation, at that time, was seen as a goal – and once obtained would no longer be needed.

To achieve this goal of regulation, the regulator needed to establish conditions for interconnection, licensing, pricing, and so forth, which were transparent and fair. Because of the previous connection between government and the sector's service provisions by the incumbent, the regulatory authority needed to be autonomous from government and seen as also free from any suspicion of regulatory capture by any of the market players. In this context, the (good) regulatory authority's information practices during the 1990s and early 21st century, were concerned with providing basic information around the laws and regulations governing the sector, technical specifications and equipment certification, terms of agreements and so forth.

After more than a decade of experience, it has become clear, however, that this understanding of regulation is no longer accurate, if it ever was. More appropriately, we can now view regulation as an ongoing process of negotiation between different sector stakeholders. This is because markets do not always work as they are supposed to and because technology continues to evolve and elude the specificities of previous regulation.

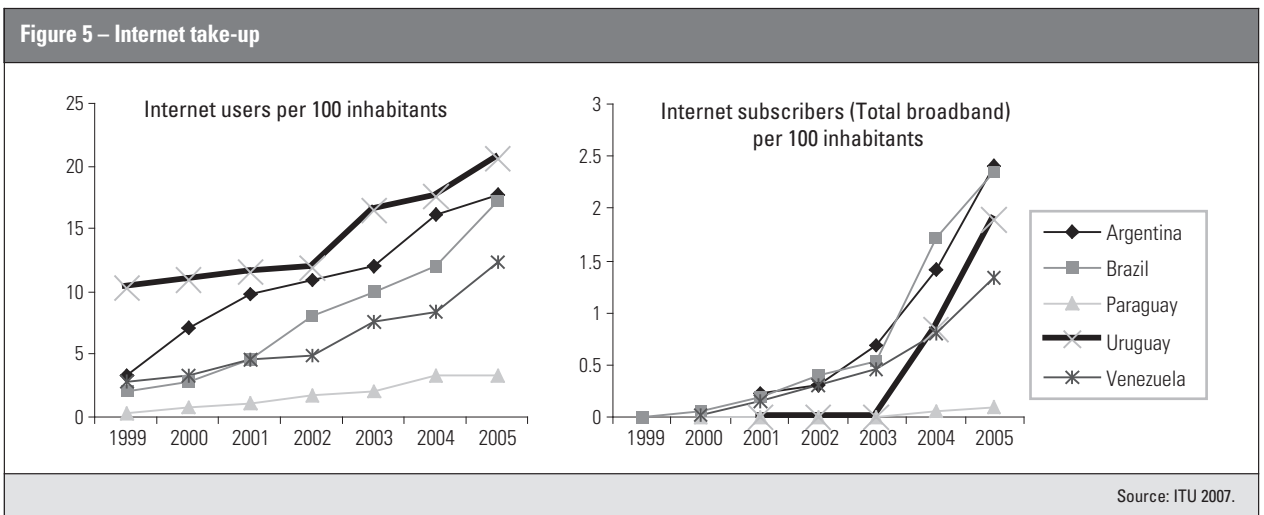
Private sector stakeholders have historically had the most clear relationship with the regulator, simply because ongoing private sector activities are the primary object of regulatory scrutiny and oversight. Thus, it is not surprising that regulators tend to offer a good range of information, services and applications to facilitate conducting telecom business in the country.

It is increasingly clear that regulators should strive to serve all stakeholders equitably. Consumers who are armed with adequate information about the services on offer can make informed choices about which provider will best meet their needs in terms of price, quality and type of service. And consequently, the ability to choose between different offerings encourages competition on these different levels. Likewise, users and citizens who are aware of their rights and understand regulatory processes can participate in decision-making about the sector and ultimately about the conditions for their children, families and communities being able to access the network and benefit from the information society in Uruguay.

4. Information diffusion and access

At the time of this study, URSEC's information and communication tools and mechanisms for communicating with its citizens were largely insufficient. The number of people and financial resources dedicated to the management of information and external communication demonstrate the level of importance given to it until now. Only two staff people have been assigned these tasks – one manager who is also the Director of Institutional Relations and who works closely with URSEC's upper echelon; and a functionary responsible for URSEC website content.

Graziano Pascale, Director of Institutional Relations, maintains contact with the press, sporadically prepares and issues press releases and makes decisions concerning website con-



tent, among other tasks. He is also partially dedicated to other matters not related to this primary area of responsibility.

An example of the limitations encountered during our investigation, during the months preceding the finalisation of this study no resources were available to maintain a third-party contract for press clippings to allow URSEC to observe how it is treated in the Uruguayan written press and what subjects are addressed that relate to its competency as a regulator. Pascale mentions this himself, affirming that: *“we have very severe financial limitations, very severe. To give you an example, we are hosting a seminar here next week and I need to go rent a projector in order to give the presentation. You can see it clearly in small details such as these. Although I am on staff, I don't have access to the press everyday. I have to resort to accessing it online. Sometimes somebody clips articles and sends them to me, sometimes I buy it out of my own pocket. These are minor details, but budgetary limitations all the same. Sometimes these are due to an organisational problem, hierarchy of tasks, budgetary or administrative problems or internal controls. There are a variety of circumstances,”* he reaffirmed, *“but one is not always in an optimal situation to overcome such anxieties.”*

For this functionary, the basic tool used by URSEC *“is the website. Further, if there are certain issues of punctual importance and if the Director decides that they merit press releases or concrete actions, we also use the mass media.”*

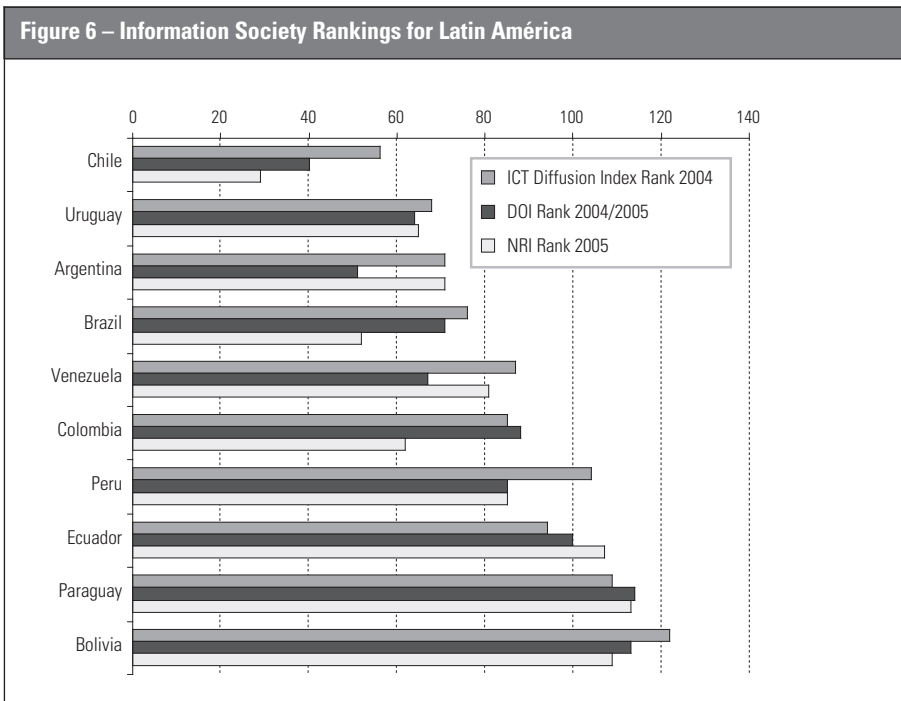
4.1 The website

An analysis of the URSEC website³ reveals that it is out of date and contains a number of deficiencies in terms of structure, provision of information and communication mechanisms for users and consumers.⁴

A quick review of the website's content shows that available information is largely basic and atemporal. The online information is largely related to the regulator itself (objectives, legal responsibilities, integration, etc.), the current legal framework⁵ and guidelines for the most common procedures carried out with the regulator.

Information on spectrum use and the operational structure of certain services (especially broadcasting) is also made public to an acceptable degree. Information concerning subscriber-based television services is more limited. While there is information concerning who has been granted licences, this information is neither complete nor up-to-date.⁶ In many countries this information is private or not made public, broadcasting-related information being one such example. On the URSEC website, the activities of companies holding frequency licenses are clearly identified.

URSEC budgetary information is not up-to-date with only the 2001-2003 financial years having been published online. The site offers a limited number of publications and presentations and public statements by URSEC's directors, but only up to November 2003. The “Events” page has more ample content thanks to the seminars held during 2006 and the inclusion of the papers that were presented at these seminars.



The website offers updated market information such as interconnection rates (February 2007), as well as studies such as on the evolution of telecom markets in Uruguay (August 2006) and evolution of telephone service markets in Uruguay (February 2005). Studies such as these, even without being kept up-to-date, are good contributions to the site but are inadequate in terms of the body of information needed by operators and citizens. This is the type of study that an organisation such as URSEC must engage in to further develop its work.

The latest applied operational rates (resolution of December 2005) as well as instructions and forms for service operators making payment of the Regulatory Framework Control Fee are available. However, there is no information pertaining to users and consumers (and their associations) that provides analysis such as price and service comparisons.⁷

The site offers up-to-date minutes of the MERCOSUR technical group meetings in which URSEC participates, as well as scanned copies of the original resolutions passed by this body and the office of the Presidency, such as changes in ownership, administrative sanctions, etc. Nevertheless, there is no space for publicizing information concerning other activities of the everyday management activities of URSEC, something the majority of regulators in the region make available on their front page. In addition, the “News” page promising that *“Here you can find the most recent actions of URSEC”* has only six entries, the last one being from December 2003.

Likewise, the “User’s” page is quite limited and not sufficiently emphasised on the front page of the website. Users are only cursorily informed of their rights,⁸ given access to a feedback form and a plan for evaluating the site. While it was beyond the possibility of this study to analyse its real impact, it

is important that the website provides a direct means for communicating with the directors of URSEC.

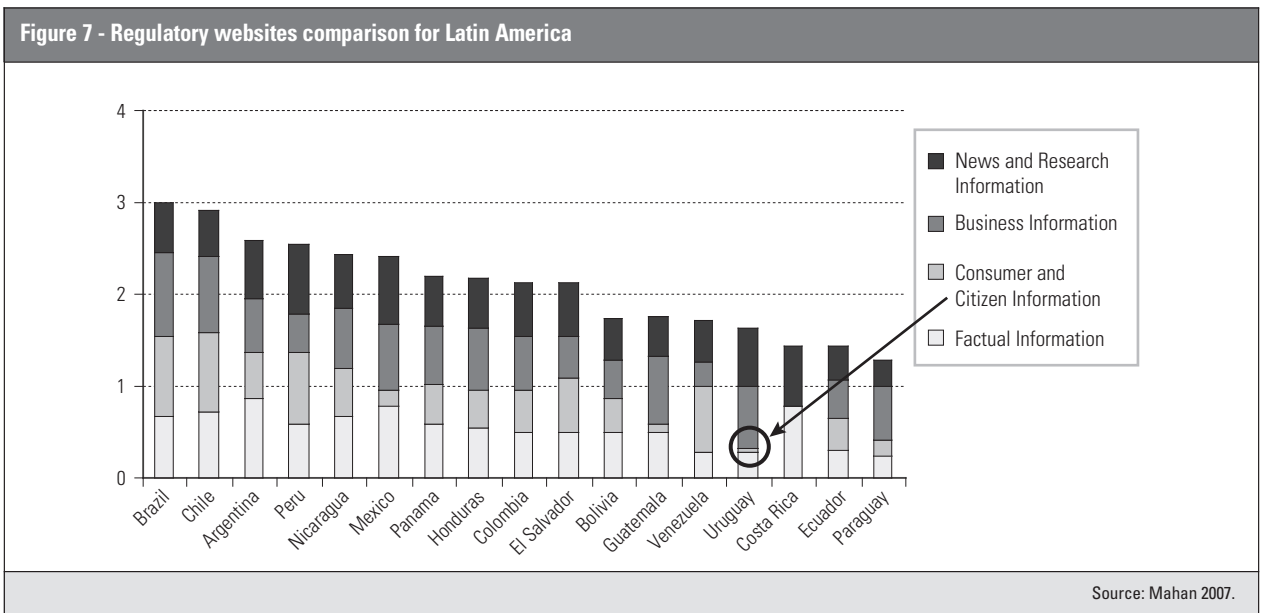
As the only practical means to orient consumers, it provides information on how one can rescind a mobile telephone contract.⁹ There is no other mention of procedures or mechanisms for complaints or contacting representatives of the officially recognised consumers associations.

Figure 7 summarises the findings of a regional assessment of regulatory websites across the region, looking at how well information is provided across general thematic categories of information.¹⁰ URSEC appears to not view their website as an important vehicle in this regard. Across the different rankings, the consumer and citizen information category was by far the most neglected, with the URSEC website being evaluated as providing little or no information about public participation in regulatory processes, universal service or consumer rights.

Multiple explanations for the state of URSEC’s website, a fundamental tool in the information and communication strategy of any telecom regulator, became apparent during the course of analysis and interviews. Among them are politico-communicational, structural, budgetary and personal capacity limitations.

It is important to note that during our investigation we did not encounter any demonstrated predisposition to hiding information. However, public information that various authorities within the organisation should and would like to make available in a transparent and public matter, cannot be found in an adequately complete and timely fashion.

At times, this is due to internal bureaucratic disorder or the product of poor working relationships between functionaries due to a generally poor level of internal functionality within the organisation, albeit as noted above, is currently in the midst of



revision. It was also commented that there were no clear and established procedures for updating website information, and this posed serious obstacles for its administration: *“the question that arises most often from the functionaries themselves is how to respond when users call asking whether information posted on the website is correct. This information is bound to change the image of the institution and the credibility of its actions,”* notes Mariela Machado (of URSEC).

Regulatory websites are rapidly becoming a significant vehicle of communication and information sharing with operators, consumers and the general public. Because there is high use of Internet in Uruguay, the URSEC institutional website could offer a transparent and accessible source of information and facilitate procedures.

4.2 Public consultations

Like the institutional website, public consultations are an important way for consumers and citizens to learn about and participate in regulatory processes. As shown in Table 1, there are different forms (and names for) public hearings or audiences. But their same intention is the goal of informing and obtaining input and feedback from stakeholders in the country's regulatory processes. Public consultations can address a range of themes such as technical decisions or policy proposals that need to be implemented. Such public events, especially if properly prepared with sufficient information circulated and sufficient time for discussion and response, contribute to the transparency of regulatory practices.

Country	Consultations announced on regulatory authority websites during the past three years	Information about the topic online?	Information about how to participate online?	Can submissions be made online?	Are all submissions available for consultation via the website?
Argentina					
Bolivia					
Brazil	12 public calls, 2004-2006	yes	yes	yes	no
Colombia					
Costa Rica	219,* 2004-2006 (public audiences)	yes	yes	yes	no
Cuba					
Chile	7, 2004-2007(public consultations)	yes	no	no	yes
Ecuador	9, 2006-2007 (public audiences)	yes	yes	yes	yes
El Salvador					
Guatemala					
Honduras	2 public consultations, 2007	yes	yes	yes	no
México	1 public consultation, 2006	yes	yes	yes	yes
Nicaragua	1 public consultation, 2006	yes	yes	no	yes
Panama	2 public consultations 2005-2006 - 3 public audiences 2005-2006	yes	yes	yes	yes
Paraguay					
Peru	8 public hearing, 2004-2006	yes	yes	yes	no
Dominican Republic	1 public hearing, 2005 – 3 public consultations, 2005-2006	yes	yes for public hearing - no for public consultations		
Uruguay**	5 public consultations, 2004-2006	yes	yes	yes	2005-6 yes 2004 no
Venezuela	27 public consultations, 2004-2006	yes	yes	yes	no

* This includes themes for all public services (not just telecom). The Costa Rican regulator, ARESEP, has the broad mandate of regulating a range of public services. Also, in some of the provinces, public audiences were held but there were no participants.
Source: NRA websites.

** Public Consultation for Selection of International Long-Distance Multi-Service System for SMS Message Marking (April 2006), Public Consultation on Indicators of Telecommunications Services (June 2005), Public Consultation on Multi-Service Long Distance Service (February 2005), Database for regulatory use (September 2004), Fundamental Plans for Numbers and Signals and for Pre-subscription Regulation (January 2004)
Source: URSEC website

Not the same as public consultations, but with similar intention to inform stakeholders, URSEC has held a number of public seminars on regulatory issues – and as noted in the previous section, the presentations from these are available on the URSEC website. Public consultations – an open call for public opinions on decisions and new regulations – are denoted as a regulatory best practice and are used in other countries, but until recently have been employed rarely, in Uruguay. *“Public consultations are an example of how stakeholders are given space and listened to,”* affirms Graziano Pascale. *“The public consultation is an established mechanism, there have been several, I believe more than ten public consultations on different subjects, technical in the majority of cases, but public consultations all the same. Anybody that is interested can submit their opinion through the website and this has indeed occurred.”*

Since 2003, public consultations have been carried out by URSEC on new spectrum management regulation, a new telecom licensing regulation, telephone channels and signals, databases for regulatory use, draft legislation for low-power broadcasters and more.¹¹ According to available information, actors who participate generally are directly interested service operators and enterprises, academics on occasion and, very rarely, social organisations or citizens.¹² For Pascale, the ‘directly involved’ form 99.9% of those who respond to the consultation.¹³

In several of these consultations, *“I remember an announcement being published in the press, above all when there is a subject that will have considerable direct impact upon service operators”*, reaffirmed Graziano Pascale, *“moreover, press releases were sent to journalists.”* However, *“when they concern very technical matters, questions regarding telephony or signalling, the reality is that interested parties are notified so that they read the document and make contributions.”*

4.3 Print media

Shortcomings observed in the online environment are reproduced in the print media. It has been more than two years since URSEC has published an institutional pamphlet. Nor has URSEC issued press releases, published studies or information relevant to users, consumers or service operators.

Since its creation in 2001, URSEC has published only two pamphlets on the characteristics and actions of the organisation including a budgetary resume. The first, referring to the period 2001-2002, is entitled *“The regulation of communication in Uruguay: first steps”* and the second from the period 2002-2003, entitled *“Towards the consolidation of a new communications framework,”* was published in 2004.

4.4 Mass media and the public interest

The use of radio and television and their relation to URSEC have a special importance as media for diffusion and communication with the population, taking into account the weight of their impact on the formation of opinions and the creation of meanings. The current study confirms that URSEC has not employed a strategy with defined objectives to ensure its pres-

ence in the communications media. When recourse to mass media has occurred,¹⁴ it has generally manifested as notification to journalists of actions that URSEC has taken, and making these actions known to certain media interested in the subject or in a reactive and defensive manner.

Often this form of communication is employed to contest opinions of opposition party leaders or of business persons affected by URSEC’s decisions (lack of thereof). Hence, the importance or relevancy of these decisions is signalled by the reactions of those directly involved (either directly or through sector lobbying targeting political party members sensitive to their demands).

Notably, not even positive news, in the sense of actions or decisions taken by URSEC for the benefit of its image with regard to the public and stakeholders, has been given proper media diffusion.¹⁵

This issue has already been raised during the internal revision process of the organisation. Machado observes, *“we must anticipate rather than working reactively. It is URSEC that must define its direction and develop areas of thematic importance, or at least interest. And this must happen first, providing information and educating the people. [...] It has to do with giving positive signals, explaining this to society, having quality information for conceptualising decisions, the primary objective being the rights of citizens. Add to this other concepts such as interests created between service operators and license holders, or the public not being prepared, lacking information and not having a culture of complaining, it is much easier to take into account pre-existing interests. These are the interests to which the people are most accustomed and which more easily gain credibility in their discourse.”*

Responsibility for presenting the official voice of URSEC has been assumed, almost in exclusivity, by president, León Lev. Through interviews he has presented the position and arguments of URSEC with regard to all polemic themes that the administration has encountered; or an explanation of the objectives and authority of the organisation. He is treated as a political leader who had been a Frente Amplio deputy, with ample experience both within the party and with the media, allowing him to fluidly carry out his work.

The role played by the regulator with respect to television and radio service operators makes the identification of these deficiencies regarding actions, resources and communication strategies quite worrisome. In addition, the managers of these media and telecom enterprises greatly influence the public agenda while being concerned with corporate interests affected by the actions of the regulatory body.

If we take into account the strong vested interests of this environment, we cannot ignore the fact that these interests will not always be in accord with the general public interest nor with the rights of users, citizens and consumers, if not the corporate interests of these groups. The context deteriorates further in assessing levels concentration in television media and the weight of the corporate image, as well as the economic

weight these telecom enterprises have in accessing these same media through paid advertising.

The public agenda does not so much refer to a list of established subjects as to the manner in which the priority, extent and relevancy of what appears in the media affects the public opinion. Thus, the priority, extent and relevancy of these issues are not defined through public policy or the regulator's communication strategy but by other interests such as political parties, journalists or corporations. Ultimately, this situation greatly affects the image of the regulator as a body working with the population with concern for their rights and other related issues that are at play.

This environment is complex and generally unfavourable to the objectives that URSEC must defend and promote. These require conscious, vested and organised action in order to succeed in the role of effectively defending the rights of consumers and users.

This situation, well known to Uruguayan authorities and to the regulator itself, is all the more paradoxical due to the lack of use of a legislative tool which allows URSEC to use radio and television free of charge. The measure provides URSEC with up to thirty minutes per day of free media space for regulatory messages or campaigns, but this has been used on only a few occasions.¹⁶

For Pascale, part of the explanation has to do with the origin of the regulation which permits this use of the media, passed during the military dictatorship:¹⁷ *"it is a law that has always been questioned due to its origin, in an authoritarian government. It has been used on occasion – never in excess of the thirty minutes – when there have been very brief campaigns, but always in a friendly manner. It was less of an imposition and more the fruit of a dialogue with the media that accepted (to run the campaign)."*

5. Defence of user and consumer rights

The principal relationship between URSEC and citizens is via feedback mechanisms or consultation with users and consumers (clients, in the terminology of the regulator). Clients are treated equally to public and private service operators with regards to their proper activities.

5.1 The legal framework

Legal capacity concerning the defence of user and consumer rights regarding telecommunication and broadcasting are detailed in the founding law of the regulatory authority.¹⁸ Accordingly, URSEC has been given the following responsibilities and powers:¹⁹

- e. control the installation and functioning, as well as the quality, regularity and range of telecommunications services, be they rendered by public or private operators.
- p. ensure the rendering of promised services by public and private service operators according to their ability, applicable juridical and

technical norms, (and) requiring the provision of any and all information by these operators.

q. to the best of their ability, receive, guide and resolve all official user and consumer complaints regarding promised services that have not been resolved by service operators.

r. protect the rights of users and consumers, thus permitting for the exertion of powers attributed to the administrative authorities in Law N° 17.250, August 11 2000.

Law 17.250²⁰ regulates the country's consumer relations. URSEC has exclusive responsibility for its application in matters concerning telecommunications. This norm establishes possible actions that can be taken by consumers and users as well as sanctions that can be applied to companies. Defence of user and consumer rights has been taken on as a central task during the entire existence of URSEC²¹ and the current administration has spoken of it insistently. The president of URSEC, León Lev, has publicly described it as one of the regulatory authority's four priorities during his mandate. In order to facilitate and ensure that telecom and broadcasting operators satisfy their responsibilities and obligations to users and consumers, URSEC must accomplish objectives originating within this and other legal norms.

The prevailing legal framework establishes that individuals or companies licensed to operate telecom services are prohibited from "engaging in practices that limit, impede or distort the right of clients²² and users²³ to freely choose" such services.²⁴

In addition to requiring the satisfaction of contractual obligations, in order to obtain regulatory authorisation, service providers have the following obligations with respect to clients or users:

- (i) Provide clients or users with adequate and truthful information with respect to conditions of service provision and contractual service agreement.
- (ii) Make public the prices, promotions and service plans offered.
- (iii) Do not include, in contracts, clauses that imply unjustified inequalities between the rights and obligations of the parties.
- (iv) Design client invoices in a manner whereby the provided information will be easy to understand and wherein fees are clearly described as follows: services, hour segments, subscription, fixed charges, variable charges, supplementary services, tax, etc.
- (v) Operate a telephone number through which clients can access information related to services and make complaints.

The manner in which clients' and users' rights are affected is considered an aggravating factor in the application of preventative measures.²⁵

The prevailing legislation concerning radio and terrestrial television is the Radio Broadcasting Law N°14.670 and Regulation N°734/78. Both were passed during the military dictatorship. The rights of radio broadcast users have been traditionally limited to problems of interference with reception

within the home. However, this is not always the case, one example being the assumption of programming agreements in order to obtain authorisation for the use of a radio frequency.²⁶

5.2 Dormant rights

Gabriel Barandiarán, former member of Parliament and current director of Causa Común,²⁷ a consumer association, agrees that there are “serious difficulties in accessing information. Even the most basic information found on the URSEC website is incredibly scarce. One can see who they are, what they are, their photos, the articles, all the basic information. However, one cannot make a complaint via the website. By way of a basic example, I do not have access to cable service operator contracts and I would like to have them before I approach the company, who will not provide me with these. Or, as a consumer organisation, it would interest me to see these contracts in order to ascertain that a certain contract should or should not be signed. I might advise that if you sign this contract you should be aware of Part Three, say because of particular obligations implied there. However, I cannot do this because I do not have the contract and if I ask the service operator, they will not provide me with one.”

But the capacity of citizens, users and consumers to exert pressure and make their presence known does not only depend on the opportunities and tools provided by a regulatory framework and the everyday management of URSEC. This capacity is also determined by the inherent characteristics and the development of social organisations, an awareness of their rights and the ability to exercise them.

In Uruguay, there is not a clear understanding of the rights that consumers, users and citizens have. This is not just the case for telecom related issues. People are not accustomed to complaining about a poorly provided service or something purchased in a poor state. This is the reality, even if the Uruguayan legislation concerning consumer relations was recently enacted.²⁸

Yandira Vega, representative of Consumidores y Usuarios Asociados (Associated Consumers and Users), is very critical of this situation: “Uruguayans are very comfortable, they are people who do not mobilise for anything and this has been proven many times over. For people here, there is a cost to walking five blocks and taking a bus to come here to exercise their rights. Thus, it is very difficult to improve this situation. If no social group can fully take responsibility and organise, nothing is going to happen.”

According to the associations consulted during this study, few inquiries and complaints related to telecommunications have ever been filed. However, this situation has improved in recent years due to the growing cellular telephone market.

According to Mario Bergara, Deputy Minister of Economy and Finance (MEF) and Director of URSEC from 2001 to the beginning of 2005, “there is no dynamic of systematic complaints.” Among other reasons, it is a cultural issue “insofar as Uruguayans do not have a sense of contributing to their rights and obligations. Nor do they feel like consumers with rights and

obligations. In terms of basic services, Uruguayans have always felt protected by the State.”

Barandiarán, in the same vein, asserts: “Uruguay is a country highly oriented towards provision. I’m 47 years old and I remember that the State – when I was young – provided you with basic goods as well as those that were not very necessary. This includes monitoring and establishing prices. There were public companies for urban transportation, a national slaughterhouse, not to mention the public enterprises that we have today, including recently established companies dedicated to the production of alcohol as a mechanism for protecting public health. In Uruguay, this has resulted in a situation whereby we have been born and raised in an environment directed by provision. The big issue was what we needed to produce and under what conditions production was possible, not the vision of the consumer participating and changing the rules of the game. Thus, in Uruguay we pay more attention to the subject because it costs us more to change these sorts of things than in other countries. We can clearly see this in the case of the communications regulators which are focused more on administering supply, rather than on understanding the rationale behind demand.”

5.3 The role of URSEC

A particular case concerning subscriber based television service contracts (cable, wireless cable and UHF) has served as precedent for URSEC’s role in guaranteeing defence of consumer rights and illustrates the challenges that can confront the organisation.

During the profound economic crisis that took place in Uruguay during 2002, families needed to eliminate unnecessary expenses. One of the first things they decided to eliminate was subscriber television. In massive numbers, people wanted to cancel their contracts, which the companies resisted. This conflict was rectified with the use of an article in the Consumer Defence Law prohibiting the inclusion of abusive clauses in contracts.

The contractual clause made service obligatory for one year, something ostensibly reasonable since it did not include installation charges. The problem, however, as Mario Bergara explains, was that “at the end of the year, if you had not notified the company during the previous two months that you planned to cancel your contract, the contract was automatically renewed for another year. Thus, if you want to cancel your contract after one month of service, you must still pay for the following eleven months.”

URSEC’s legal advisor confirmed that this was to be considered a case of abuse and began a negotiation process that resulted in a solution that was not acceptable to the consumer associations. The regulator decided to act in the collective interest and thanks to an agreement with the groups representing subscriber television operators, annulled the previously mentioned contractual article but permitted television operators to charge two months of indemnification.

For the Asociaciones de Consumidores “the law establishes that, in the case of an abusive clause, the contract continues to exist, but without the offending clause. Thus, the mere fact of the clause having been declared abusive meant that, from that moment onward, any consumer could cancel when they wanted,” observes Barandiarán. Nevertheless, “URSEC agreed with the cable companies upon an indemnification mechanism for cancellations, which is illegal.²⁹ It is absolutely illegal because the law already gave me the right to cancel my contract due to the exclusion of an abusive clause. What was the reason for indemnification? It doesn't make any sense to demand indemnification for exercising a right.”

Barandiarán, head of the Causa Común, observes that the explanation is simple: “remember the following – ‘the television channels are very powerful, an electoral campaign is coming’ – ... this is a typical situation. And this situation reveals the role that regulators ultimately fulfil as opposed to the true role they could play throughout the country. Here we have a conflict. The regulators administer supply or negotiate with suppliers more than achieving their role in defending consumers.”

Barandiarán notes that the regulators' role can be seen in two ways: “the regulators themselves assuming the defence of the public interest (as in this case) rather than being weakened by it, or empowering organisations that can do it properly such as Causa Común, CUA or 80 others, allowing them to act as arbitrators. Because in the previous case, rather than defending the public interest, the regulator forced us to say, ‘look here, at Causa Común we are pushing for this and our lawyers have something to say on the matter, come and all three of us will talk’. And this worked out better because the regulator acted as an arbitrator rather than as a party to the negotiations, although their actions were fairly weak.”

5.4 Promoting rights

To promote consumer rights, among other measures, URSEC issued a notice on television,³⁰ although according to the ex-director of URSEC, Mario Bergara, “in general, it was not an organised group of consumers who responded. Rather, they were all individual interventions from people who went to the company and were treated poorly or were told that they would not be able to end their contract for ten months.” Bergara affirmed that associations' participation was very minimal and that “URSEC was not prepared to receive a massive number of interventions, but I will tell you that it received around 500 of them.”

This had been one of the arguments advanced by Graziano Pascale in discussing creation of a mass media campaign on rights and the ways in which citizens can make claims: “the problem that we also see is that if one proceeds with this campaign without a system for interventions in place, it is useless. Because you carry out a campaign and say ‘come to URSEC, bring your complaint’, and somebody comes with a complaint and says ‘Now that I've come with my complaint, what do I do?’, ‘You need to go to the legal department and within five to ten days...’. So, a campaign that raises expectations – but which cannot satisfy these expectations – is one that is ultimately more

negative than positive, and that creates more biases than benefits.”

The interviews carried out during this study and the existence of a plan for profoundly modifying the internal structure of URSEC attest to this situation. “There are neither procedures nor filters for dealing with the diverse interventions we are presented with. Nor control,” affirms Machado.

Even if URSEC raises expectations of being consulted or able to make a claim for their rights, it does not possess the necessary conditions for responding to this demand. There are insufficient numbers of functionaries who are adequately trained, nor is there an adequate telephone system or other mechanisms and procedures for managing and responding efficiently to the population.

According to Pascale, the current URSEC administration has chosen to work in reverse: “first we are preparing to receive people instead of inviting people who come while we are not prepared to respond to them,” thus generating frustration and a loss of credibility for the institution. The only problem is the amount of time it will take for this system to become operational.

Except for isolated events, there has not been a permanent or systematic campaign to sensitise and educate citizens about their rights since the creation of URSEC.

Bergara acknowledges this while affirming that, in addition to a lack of consumer culture that “exercises their rights, URSEC has not offered any sort of institutional representative responsible for this. The administration is in a very preliminary stage in which actions are very much reactive, that is, they function if there is a problem with a corresponding intervention, but there is not an active policy to educate consumers and facilitate them to exercise their rights. This, I think, is the second step in the maturation of these regulatory organisations.”

6. Relations with civil society

Civil society participation exceeds the framework of users, consumers or clients when it transcends the limited relationship between an individual and a corporation. In this manner, citizen participation can play a significant role in the elaboration, definition and implementation of state policies and decisions concerning telecommunications and broadcasting.

This implies the existence of clear and concrete mechanisms concerning information, communication and participation. It also serves to identify current stakeholders in these processes and who should participate. In this respect, Machado inquires: “Is there a real discussion of who is involved? Who needs to be involved to achieve the objectives that I have been assigned? Does the institution have a policy to facilitate the involvement of all stakeholders? These definitions should not be absent.”

General practice has been to deal with service operators individually as well with their professional associations. There are various mechanisms and guidelines for facilitating these

relationships as well as functionaries and resources dedicated to them. This is largely thanks to the accumulated experience of the now defunct Dirección Nacional de Comunicaciones (National Communications Directorate).

The creation of URSEC and the growing recognition of user and consumer rights have been developing another area of attention for the organisation and its functionaries. This development of interest, however, is not yet accompanied by the resources, personnel and training needed to meet this challenge.

6.1 Consumer Associations

There are only four recognised consumers' associations in the country:³¹ the Liga Uruguaya de Defensa del Consumidor (LIUDECO – Uruguayan League for Consumer Defence), the Liga de Amas de Casa (Housekeepers' League), Consumidores y Usuarios (Consumers and Users), Causa Común (Common Cause) and Consumidores y Usuarios Asociados (Associated Consumers and Users). This recognition has strengthened the associations, resulting in various state responsibilities, due to voluntary effort and persistence. They have also won some important judgments. According to qualified observers, however, these organisations are still weak, with questionable representation and little (but increasing) legitimacy with respect to corporations and authorities within the sector.

For the president of URSEC, León Lev, *“there are no representative organisations. This is the reality in Uruguayan society; there are no organisations that have acquired a cumulative history of experience in order to play such a role,”* making reference to the various civil society organisations. Hence, *“one must be careful to guarantee a spectrum of plurality, democracy and representation to avoid claims that we are under the power of civil society.”*

According to Gabriel Barandiarán of Causa Común it is not easy to create and maintain a consumer defence organisation in Uruguay. *“We are the NGOs that people have the least confidence in institutionally. Consumer organisations cannot maintain corporate support and in Uruguay it is very difficult to maintain anything with citizen support simply due economic reasons. This situation – the disequilibria of power in society – will be resolved when the State itself stimulates the development of consumer organisations, assuring that they satisfy certain conditions – such as in Spain, for example. There they are required to have representatives from all the provinces, no less than five per region. They are required to be open to the public during set hours and are guaranteed equal resources. They are, however, subsidised.”* Without such aid and infrastructure, he affirms, consumer organisations will continue to be very weak.

Representation and legitimacy of consumer and user associations is not only a matter of composition and structure. Although it can be agreed that *“there is not much of a culture or tradition of consumer associations in Uruguay”* and that *“only now are they appearing at some level, with dubious representation.”* For Bergara, *“the representation of consumers is a very vague concept. It is not very clear that an organisation defends*

the rights of the consumers in a delimited sector. Because there can also be other groups that argue: ‘we also defend the rights of consumers’ or ‘no, we have our own representation’. Thus, while in a union environment there are certain rules to the game to say that a certain sector is represented by a certain guild, it is not very clear at the consumer level how to legitimise their representation.”

He adds, *“I envision a regulator that functions much better when vested interests are made explicit. It is a strategic player in a game of vested interests. Thus, when these interests are identified in a clear manner the regulator can function better, in a way that is more transparent and independent. The existence of consumer interest groups will help identify these interests, but it will be difficult for them to say what level of representation a certain organisation should have. The business sector either represents itself or their employee organisations operate as defenders of their interests. This level of clarity is more difficult in the case of users.”*

URSEC has not yet developed a fluid relationship with the consumer associations that exist today and which have been recognised by the State as valid actors under the scope of the Consumer Relations Law. The only meeting with these groups took place in 2006 and was organised by URSEC. For Yandira Vega, *“it was an innocuous meeting. It was a meeting in which the consumer associations were brought together, but was ultimately a presentation of little importance.”*

Asked why there had not been more of an established relationship – through regular meetings, for example – Vega admits, *“it is probably because we haven't requested them, that could be it.”* Upon further reflection, she adds: *“but they haven't requested meetings with the associations, either. We could do it. We already meet with URSEA,³² we've met many times with resulting actions. We have meetings, they listen to what we say, take care of the problems that we have. URSEA is completely different.”*

For the president of CUA, *“one of the things that URSEC needs to do is meet with us, the associations, and give us a bit of power like URSEA does. Our work is recognised by the State so what we're asking for is a response from the political actors. Note that I've now been invited to participate on a commission of the Oficina de Planeamiento y Presupuesto (OPP – Office of Planning and Budget) which reports directly to the President of the Republic so there has been strong state recognition in some instances. But not from URSEC.”*

6.2 Citizens and other social organisations

Another approach to regulatory inclusion, in which people (and their organisations) are considered as citizens and not as consumers, is incorporated into the analysis of many of our interviews. However, the everyday practice of the regulator seems to be very far from demonstrating effective forms of participation. If there are difficulties in the relationship between URSEC and consumers and their associations, these difficulties are even greater when the mechanisms, communication tools and participation of social groups and citizens are examined.

Two initiatives, used as tools for enabling the relationship and communication with different public sectors, have had little impact on citizens and their organisations. One is the hosting of seminars and other types of events, especially during 2006. These seminars address diverse subjects relevant to the functions of URSEC and are intended to inform, but also to receive opinions and interventions from the general public.

Seminars held during 2006 included *“the new challenges confronting the regulation of public services”*³³ (25 April), *“International seminar on the challenges of Digital Terrestrial Television (DTT) and its regulation in Uruguay”*³⁴ (17 May), and *“Working Day on Digital Terrestrial Television in Uruguay”* (9 August). For the latter, representatives from the digital television standards groups gave presentations to *“national authorities, broadcasters, university professors and students, accredited diplomats in Uruguay, NGO representatives, union leaders and the general public.”*³⁵

Although some people connected with social organisations participated as audience members, the cycle of lectures was shortened and there was not space for civil society and other actors to make their opinions known, although this had been the original plan.

6.3 Citizen participation other than complaint filing

Other interesting events were public activities entitled *“Regulatory Authorities Settling Accounts”* held in 2002³⁶ and 2004,³⁷ in which the directors of the regulatory authorities presented budgets, information on management and explained their objectives and characteristics at a time when the very idea of a regulator was neither understood or directly called into question.

Sessions were held, such as: *“Service regulation for the well-being of consumers”*, the legal perspective on *“Service regulation for the well-being of consumers”* and *“Institutional design and regulatory frameworks.”* On a negative note, it should be observed that these events were fundamentally organised from within the political system, with only the leaders of the three major political parties given space to voice their opinions.³⁸ Unfortunately, no opportunity was made available for other opinions to be taken into account until the final activity.

There are not many precedents of civil society participation in elaboration processes or strategy decisions. Nevertheless, despite the dilemma of identifying who will be representative, many of our interview subjects support the idea of greater participation on the part of these sectors.

Former Director of URSEC, Mario Bergara, in addition to the consumer perspective, thinks that the regulator must also include a citizens' perspective *“in the assessment of policies and guaranteeing the rules of the game. I don't think these two elements are in opposition to each other. I believe in understanding consumer relations and that the regulator in this case is the authority, applying a determined consumer relations regulation. Thus, the regulator is obligated to consider the individual as a consumer, but when it comes to actions as a regulator, you must try to defend the rights of citizens.”*

In terms of representation, Lev commented: *“As a regulator today, we cannot formally identify which civil society institutions are most representative for playing this role. We need to call for the involvement of interest groups, guaranteeing that all interested individuals have the opportunity to participate, after which the groups that are truly representative will come to have a place in decision-making bodies.”*

URSEC assures that when it broadens the composition of its regulatory committees, it will also open them up to *“civil society, to offer the opportunity to participate.”* According to León Lev, *“this is an innovative element tied to the concept of democratisation in that we need to assure that we effectively facilitate broad participation rather than favouring the interests of which we are in favour.”*

Civil society groups do, indeed, continue to have capacity-related difficulties that affect their abilities to fully participate in these processes. The present development of consumer associations has already been cited as an example of this situation.

URSEC understands that: *“there is no historical relationship between telecom companies, civil society organisations and the state. Corporate organisations have much more history, in this respect, than civil society organisations.”*

Nevertheless, the president of URSEC stated at the Foro de Comunicación y Participación Ciudadana (Communication and Citizen Participation Forum), *“as a representative organisation, with some fifteen civil organisations including those representing journalists, community radio stations, content producers, consumer defence leagues...”*³⁹ [...] *Civil society, after many years, encountered a state that was passive, a state that was not looking for a participatory civil society”,* says Lev. *“The state did not educate citizens and civil society to defend their rights and I think that this is a responsibility of the state in that the state communicates with society and can facilitate the participation of civil society.”*

“This is the path to take”, he affirms, advocating an advisory role for civil society while not ruling out that *“later, they will be able to play a more active role.”*

6.4 Policies for strengthening participation

The State, and URSEC in particular, could proactively promote this third sector as a well-developed and strong intervener. This is something mentioned by several of our interview subjects, although there were doubts as to how to do so.

The Consumer Defence Law,⁴⁰ includes the following as responsibilities of the Dirección del Área de Defensa Consumidor (Directorship of the Consumer Defence Section):

“(D) To cultivate, organise as well as integrate advisory committees composed of representatives of various industrial and commercial sectors, consumer cooperatives and associations, or composed of representatives of organisations or public bodies. These representatives will be responsible for contributing information and will be able to propose corrective measures regarding consumer defence.

E) Encourage the formation of consumer associations, the express intent of these groups being consumer defence. The Dirección del Área de Defensa Consumidor will maintain a register of these associations and they will be constituted as civil associations.”

Speaking from his experience in the organisation, Bergara asserts that *“as detailed in its legal mandate, URSEC can have active regulatory policies”*, casting aside the reactive connotation often given to the concept of defence, something generally associated with reaction to an attack. This should be interpreted by URSEC in the sense of *“watching over the rights of consumers. This concerns not only actions related to complaints, to concrete problems, but the fundamental broadening of consumer rights.”*

However, concrete support for strengthening the organisational capacity and impact of consumer and user groups is considered to be complicated, although nobody will officially say so. *“It would imply somehow that the State says: these are representatives of consumer interests. It is already difficult when dealing with union, guild or corporate matters, where the relationship is more direct. To me, it’s a complicated issue.”* In spite of this, there are working examples in Uruguay such as support from the Dirección del Área de Defensa Consumidor which disburses and coordinates funds from the Inter-American Development Bank (IDB) for strengthening social organisations working for the defence of consumers and users.⁴¹

Another interesting precedent, although an isolated one, was the formation of a working group on the situation of unlicensed and community radio broadcasters. In 2001, URSEC called together representatives from commercial radio and TV broadcasters⁴² and one of the country’s community radio associations.⁴³ Even if it was no more than a meeting with a subsequent process of informational exchange, this was an innovative attempt by the regulator to solve the problem of consumer representation through dialogue and negotiation. URSEC was not responsible for the continuity of this committee. Rather, its discontinuation was the fault of the commercial broadcasters who refused to continue even speaking with the delinquents (from the unlicensed and community broadcasters).

The last URSEC administration also invited AMARC delegates in Uruguay to participate as observers in meetings of MERCOSUR Broadcasting Working Sub-group #1 which took place in Montevideo while Uruguay held the rotating presidency of the trade bloc.

The president of URSEC participated, although in a personal capacity, in various press conferences with organisations from the Foro de Comunicación y Participación Ciudadana, a grouping of multiple Civil Society organisations working to influence communication and information related public policy. At the prompting of the Foro, León Lev participated in three working meetings, making presentations with delegates from member organisations of the Foro. In this way, it became a privileged space in which the URSEC president explained the principal strategies and actions of the regulator and listened to

questions and proposals from Civil Society members working on these subjects.

While its scope is much broader than the work of the regulator, the Foro found URSEC to be open to considering it as an actor with which, at the very least, to listen to and exchange information with. Even so, the response of URSEC to the concerns of the Foro was ultimately biased. The group not only requested the organisation of *“information and discussion groups for informally analysing subjects related to the areas of focus and specific tasks of this organisation”* with the president as well as members of the Steering Committee but also *“the creation of working groups, on various subjects, composed of organisations/individuals from the Foro.”*⁴⁴

It was initially proposed that two spaces be created – one for broadcasting and the other for digital inclusion strategies, reflecting priorities discussed within the Foro. It was also suggested that each subject be divided into multiple sub-topics, that each working group prepare their own agenda and that the best way to organise themselves would be to work in a plenary and/or preliminary sub-groups.

Exhibiting an intense level of intent, the Foro issued a mis- sive, tentatively proposing the subject of broadcasting and suggesting that analysis be broken down into the following themes: a comprehensive review of broadcasting regulation (national system and models to adopt), the public service or public interests, new radio and TV legislation, inclusion of gender perspectives, national and local production criteria and minimum standards, effective control of the conditions of use of service operators and others, community broadcasting law (regulatory and technical aspects for adoption and implementation, regularisation of existing community media and others), digital TV and radio (technical standard to adopt, regulatory framework and transition model), spectrum management (FM regulation, terrestrial TV channels, spare bandwidth use and frequency planning for digital TV, among others), advertising (regulation and control) and international broadcasting policy (shortwave and other technologies).

This proposal was not positively received, even though members of the Foro had assured that these working groups would incorporate both industry and academic representatives.

7. Institutional context

There are various possibilities for the lack of social participation in regulation. One is the lack of policy definitions, both on the part of the Uruguayan government and the regulator itself who, while not ruling out such participation, has not made this challenge a management priority.

We have also noted weaknesses – cultural, political and organisational – in certain civil society sectors and within the general population with respect to an overall understanding of rights and the defence of these rights

The context and particular characteristics of URSEC have become major themes of our work. We must note that, while not justifying its deficiencies, we are examining a regulator that is under construction internally as well as socially and industrially. With scarcely five years of existence, it is not clear yet to the Uruguayan regulatory and institutional system itself what is regulatory and should be carried out by URSEC.

According to URSEC's own president, this is its principal challenge and most important task for the immediate future: "URSEC is a very new institution that has still not managed to structure itself and gain real social authority."

Further extensions of this current study will need to take into account how this evaluation influenced other aspects of the regulator: Does URSEC have the independence, resources and authority needed to take the actions necessary for self-improvement? The demonstrated difficulties in accessing commercial economic information as a case for better regulatory financial control is a good example of the situation at hand.

In this regard, Gabriel Barandiarán noted during our interview, "regulatory organisations in Uruguay are weak. URSEC is weak compared to Telefónica or Telmex; (but) the Central Bank of Uruguay is [also] weak... If the Central Bank itself cannot maintain a strong grip on the banks, imagine what could happen with a company like Movistar or CTI..."

Speaking of the case of abusive subscriber-based television contracts, Mario Bergara admits that the solution was not perfect but thinks that it is exemplary as it obliged other companies to modify their contracts. One of the difficulties that the regulator is faced with is "the weakness of the regulations", wherein "the regulator or authority empowered by the Minister functions almost as a judge, but does not have the power to modify a contract."

In the case discussed above, the regulator could impose sanctions on the corporation individually, "but could not tell them to remove this clause", confirmed the Deputy Minister of the Economy and Finance. "What URSEC did was to say: this clause is abusive and according to consumer relations, we will either sanction you or compel you to change it; but URSEC does not have the jurisdictional capacity, only a judge can say 'this clause is not valid', the administration cannot do so. There's the problem: I can say that the clause is abusive, but I cannot declare it null and void. I can penalise the company, I could punish them for the rest of my life but I cannot revoke anything from the contract."

Likewise, URSEC operates within a regulatory framework that is missing a fundamental point of support: there is no Poder Ejecutivo (Executive Branch) body to develop and define telecommunications public policy.⁴⁵ This situation forces the regulatory authority, at times, to assume the task of defining policies when it should not and, at other times, to not act at all due to a fundamental lack of definition of its managerial jurisdiction.

Basic questions relating to structure and internal organisation of URSEC still need to be resolved or are currently in the

midst of revision. León Lev comments that "today the main concern is successfully defining the structure. Although seemingly unreal, we have not defined the structure based on budgetary resources. To successfully organise responsibilities is the first task and later we will accommodate new responsibilities."

Lev adds: "the structure inherits policies. Proactively changing the structure with new policies is going to take us some time, this is a real and impartial problem. The structure is the foundation of the functions that URSEC occupies today in terms of human and technical resources. This is no minor subject."

8. Plans for the short term

In 2006, in order to confront some of these challenges, URSEC undertook two consultative projects within the framework of an initiative with the Inter-American Development Bank (IDB) in support of regional regulatory bodies. One component of this project was a study on their communication strategies and another on their internal structures.

The first – that is closely related to our current study – was carried out by the Uruguayan company Equipos Consultores, culminating in the preparation of two documents directed at URSEC's 'external and internal publics'. The first "URSEC Communication Strategy" was presented in November 2006, the second, "URSEC Action Plan" in December 2006.⁴⁶

These documents were the result of a process that included a workshop in February 2006 and various working sessions with URSEC's Board of Directors. These meetings not only resulted in the exchange of ideas, but also in forming of decisions incorporated into final documents as a way of organizing, synthesizing and systemizing strategic information related to the regulator's communication.

The objectives of the study were to:

- evaluate and propose communication strategies for defined publics, propose changes and suggestions in order to better define the functions, services and domains fulfilled by URSEC;
- generate proposals and contribute to the planning and execution of communication activities and distribution;
- generate proposals and external and internal communication actions that reinforce the corporate image and effectively orient the public who come to the offices of URSEC.

Many of the situations observed during our study have been confirmed by this consultation and potential mechanisms for improvement have been incorporated into the above-mentioned documents.

Thus, mechanisms for improvement directed towards citizens, users and consumers are of particular interest. These include: "information pertaining to the existence, assignments and prerogatives of URSEC", "information on communication channels available to URSEC", "systemise information and make available information such as legal frameworks, resolu-

tions and public calls of interest and public consultations” and “augment levels of institutional knowledge.” These mechanisms will be useful when, for example, users want to make complaints or interventions.

It is hoped that the Action Plan during 2007 will become successful in making citizens’ rights known to them, as well as the abilities of URSEC and, in particular, the ways in which it can protect and ensure these rights. The Action Plan should also facilitate citizens’ knowledge of “the media and adequate mechanisms for exercising their rights as consumers and users of telecommunications services” and make available information pertaining to the various operators’ service packages and pricing options in order to promote a better knowledge of the options available in the market.

The strategy and action plan address deficiencies and limitations in making more information available, developing campaigns for sensitising the general population to their rights as users and consumers. These will also improve and develop mechanisms for facilitating and organizing incoming complaints and interventions.

These highly positive element of the regulator’s plans for reform are however accompanied by some notable and omissions, indicating that they have not been established as priorities in the development of strategies for improving participation and inclusion in regulatory processes. These omitted aspects, noted in all of our interviews as key themes to be considered in earnest, have not been sufficiently included in the conclusions of these consultative projects.

Mentions of any form of participation refer to individual actions more than those of organisations and the holding of regular public consultations. What is not addressed are mechanisms such as holding public seminars or meetings with social groups from the ‘general public’ – despite the fact that these groups are defined in the consultation documents as ‘leaders of public opinion’ and comprise journalists, academics, social organisations and national government representatives – who are well-positioned to pay special heed to the task of positioning URSEC’s corporate image and making better known its actions and policies.

9. Recommendations

9.1 To URSEC and other states bodies

- Develop mechanisms for encouraging effective participation in regulatory processes.
- The website needs to be reconceptualised as an interactive environment; this will help create better conditions for participation.
- Produce a public annual report (published and presented publicly).
- Maintain mechanisms for public hearings and consultations while broadening participation.

- Create consumer awareness campaign on rights.
- Mediation of consumer complaints: develop working guidelines and put them into practice.
- Industry information needs to be collected and made publicly available, including statistical information on pricing, investment, private sector revenues, etc.
- Better diffusion of information via the press and other public interest groups.
- Develop effective means for empowering consumer groups and other civil society organisation.

9.2 Future Research

TRE Evaluation

A telecommunication regulatory environment (TRE) study in Uruguay will be undertaken by LIRNE.NET in late 2007. The TRE methodology assesses the relationship between perception of regulatory risk and investment in the telecom sector. The six categories of analysis are:

- Market entry
- Allocation of scarce resources
- Interconnection
- Regulation of anti-competitive practices
- Universal service obligation
- Tariff regulation

TRE studies are being undertaken in other Latin American countries (in addition to TRE evaluations in Asia and Africa) during 2007, which will permit regional comparison of findings.

URSEC / URSEA and other comparative analyses

Benchmarking and comparing URSEC’s practices with other national regulators as well as other regional regulators may help further identify paths toward effective regulatory communicative practices with consumers, users and citizens. An evolving and open perspective is particularly demanded as ICT convergence creates new sector conditions for all stakeholders.

Process monitoring

Another evaluation of URSEC will need to be undertaken in 2008 to allow for an analysis of the organisation’s revision plan, particularly the obligations assumed by URSEC within the Action Plan adopted at the end of 2006.

Notes

¹ The authors would like to thank Alexandra Dans and Valentina Podestá for research support; Costanza Casanova for transcribing the interviews; URSEC for opening their offices to our research and questions; and the Canadian International Development Research Centre (IDRC) for funding this research.

² World Dialogue on Regulation (WDR) <www.regulateonline.org>. WDR is a project of LIRNE.NET <www.lirne.net>.

³ <<http://www.ursec.gub.uy>>

⁴ During the interview, Pascale mentions that the site “*is technologically antiquated*” in that “*it is not a very flexible site. It has been designed in a manner that does not permit it to be altered very much and it is very difficult to add new things. The site is in such a state not because we don't want to update it or because we don't know it is outdated, rather it is because it is too difficult for us to update.*”

⁵ With irregularities. For example, under “News” there are notices of two important decrees that have been passed (regulation of licenses and spectrum management), but these cannot be found on the legal framework pages.

⁶ Initial licensees are noted, but corporations which have merged or exist as the sole service provider are not. There is no reference made to successive increases in service areas, commercial data or other relevant data such as number of subscribers (for which there is only data through 2004.)

⁷ URSEC is working intensely on the creation of a database of the telecommunications sector in order to improve regulatory accountability, (with information on minutes of traffic, quantity of subscribers, cost structures for final operator charges, and more). The private sector, however, has “been a bit remiss in sending its information.”

⁸ Citing two articles of Law 17.296.

⁹ One of the principal problems concerning consumer rights.

¹⁰ The different information categories were ranked on a scale of 4 with (1) denoting that basic and largely static information is available; (2) content and information is updated regularly, and information is available not only in its original format (such as acts and legislation) but is also explained; (3) Users can download forms, contact officials and make requests. Available information has further value-added, such as being hyper-linked to relevant legislation; and (4) users can submit forms online – for example to request information, for a bureaucratic procedure, or to participate in a public hearing.

¹¹ In February 2007, a public consultation was carried out concerning the competitive procedure for assigning radio spectrum within the 3.300 MHz to 3.700 Mhz bandwidth.

¹² With the exception of the consultation concerning community radio broadcasters.

¹³ We were unable to obtain objective data to analyze as there is no systemised data with respect to received requests, their quantity, type, origin and other data, nor were they available on the website.

¹⁴ Above all, during the second administration of the organization.

¹⁵ For example, the recovery of millions of dollars from telecom companies, between 2006 and the beginning of 2007.

¹⁶ A campaign presenting URSEC, a call for expressions of interest by the Montevideo cable company, a small campaign promoting the defence of

consumer rights and communications for the license of the 3rd cellular telephone band.

¹⁷ This argument was also brandished by other actors and has heavy “ethical” weight, especially among left-wing governments. However, we must point out that the entirety of the Radio Broadcasting Law and its Regulations were passed in 1977 and 1978, respectively. When it was revised by various subsequent democratic governments, this article was never modified while others had been considered anti-democratic.

¹⁸ Budgetary Law N°17.296, February 2001 (Articles. 70 a 99), <<http://www.parlamento.gub.uy/leyes/ley17296.htm>>.

¹⁹ NB: the following does not constitute a certified translation of the Law.

²⁰ Consumer Defence Law N°17.250, August 2000, <<http://www.parlamento.gub.uy/leyes/ley17250.htm>>.

²¹ “*The well-being of the consumer is one of the principal foci of the Communications Services Regulatory Unit (URSEC) and, moreover, is at the centre the defined actions of the organization.*” 2001 – 2002 Communications regulation in Uruguay : first steps, URSEC.

²² Client – a physical or juridical person that has engaged in a contract for the provision of telecommunications services with the holder of a License. Telecommunications Licenses Regulation, Decree 115/2003, March 25 2003, Article. 3° “Definitions.”

²³ User – is a physical or juridical person that has access to a telecommunications service in either a temporary or permanent manner. Telecommunications Licenses Regulation, Decree 115/2003, Article. 3° “Definitions.”

²⁴ Telecommunications Licenses Regulation, Decree 115/2003, Article. 4° “Rights of the clients and users.”

²⁵ Telecommunications Licenses Regulation, Decree 115/2003, Article 24° “Graduation of sanctions.”

²⁶ In the current government, there have been a few attempts made by the Instituto del Niño y el Adolescente del Uruguay (Child and Adolescent Institute of Uruguay) concerning the effects of television on the childhood rights.

²⁷ Barandiarán actively participated in the elaboration of the Consumer Relations Law and, subsequently dedicated himself to these subjects within civil society.

²⁸ August 2000.

²⁹ If somebody wants to cancel, they must pay for the current month plus one additional month.

³⁰ Using the 30 free minutes.

³¹ The Consumer Relations Law establishes a series of conditions for assuring consumer representation.

³² Regulatory Unit of Energy and Water Services, created at the same time as URSEC.

³³ <http://www.ursec.gub.uy/Publicaciones/seminario_regulacion/seminario_regulacion.htm>

³⁴ <http://www.ursec.gub.uy/Publicaciones/seminario_tdt/seminario_tdt.htm>

³⁵ <http://www.ursec.gub.uy/Publicaciones/jornada_tdt/jornada_tdt.htm>

³⁶ In this case, URSEC and the former UREE (Regulatory Unit of Electrical Energy)

<http://www.ursec.gub.uy/Publicaciones/rinden_cuenta/rinden_cuenta.htm>.

³⁷ URSEC and URSEA, which took the place of UREE

<http://www.ursec.gub.uy/Publicaciones/rinden_cuenta_2004/rinden_cuenta_2004.htm>.

³⁸ Martín Ponce de León (Encuentro Progresista - Frente Amplio), Julio Herrera (Colorado Party) and Francisco Gallinal (National Party, in the first; and Sergio Abreu (Nacional Party), Danilo Astori (Encuentro Progresista - Frente Amplio) and Ariel Davrieux (Colorado Party).

³⁹ Formed in August 2004, it includes the Agrupación Trabajadores de Tevé Ciudad (AITC), Asociación de Bibliotecólogos del Uruguay (ABU), Asociación de la Prensa Uruguaya (APU), World Association of Community Radios (AMARC-Uruguay), BICE - AL (Bureau International Catholique de l'Enfance - América Latina), Comisión Nacional de Seguimiento: Mujeres por Democracia, Equidad y Ciudadanía, Consumidores y Usuarios Asociados del Uruguay (CUA), Cotidiano Mujer, Instituto de Estudios Legales y Sociales del Uruguay (IELSUR), Instituto del Tercer Mundo (ITeM), Instituto de Solidaridad y Desarrollo (ISODE), Licenciatura en Ciencias de la Comunicación (UDELAR), REDES - Amigos de la Tierra, Servicio Paz y Justicia (SERPAJ), Sociedad Amigos del Viento. Meteorología, Ambiente y Desarrollo, Sindicato Único de Telecomunicaciones (SUTEL /PIT-CNT), Tevé Ciudad and Vecinet – Autogestión vecinal. More information online : <<http://www.forocom.org.uy>>.

⁴⁰ N°17.250, previously cited.

⁴¹ Thanks to funds from the IDB, consumer associations receive a computer, photocopier, printer and fax machine and travel to the MERCOSUR Consumers Forum.

⁴² ANDEBU (Asociación Nacional de Broadcasters del Uruguay), which is composed of the owners of all commercial radio and television broadcasters in the country, and RAMI (Asociación de Radios del Interior), which is made up of commercial radio owners from the interior of the country.

⁴³ AMARC (World Association of Community Radios). La Coordinadora ECOS, another community radio association was not invited due to ANDEBU vetoing their participation.

⁴⁴ Publication entitled “*Proposal for Mr. León Lev, president of URSEC, from the Foro de Comunicación y Participación Ciudadana (Communication and Citizen Participation Forum)*” dated March 10, 2006.

⁴⁵ The Budgetary Law passed in 2005 includes the creation of a Dirección Nacional de Telecomunicaciones (National Telecommunications Directorate) that will be charged with defining the policies for this sector. The only resource it was given was the post of a director. Almost two years later, nobody has been named to the post.

⁴⁶ Although these documents were made available for our consultation, at the time of writing, these were both still internal documents and not yet public.

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Annex 1 – List of Interviews

León Lev – *URSEC* – President

Graziano Pascale – *URSEC* – Representative of Institutional Relations

Mario Bergara – *Ministry of Economy and Finance* – Deputy Minister

Yandira Vega – *Consumidores Unidos y Asociados* – Director

Gabriel Barandiarán – *Causa Común* – Director

Annex 2 – Interview Questionnaire

I. Questions for URSEC

A. Identification of key actors

1. Who do you consider to be the principal civil society actors interested in playing a role in the regulatory process?
2. Are there civil society actors with no relation with or a cursory relationship with URSEC today? Why?
3. What role is currently played by users, consumers and citizens in the development and implementation of regulations and subsequent compliance monitoring? What role should they play?

B. Communication with all interested civil society actors

4. What are the strategies, instruments and procedures that URSEC employs for communicating with or informing civil society? Is there an evaluation process to rate citizen satisfaction with these communication and information mechanisms? What is the value of these mechanisms for URSEC?
5. How does the poor or complete lack of organization of these sectors affect URSEC? Are you considering initiatives to address this weakness in Uruguay's regulatory system (education and sensitisation campaigns, promoting the formation of users groups, etc)?
6. Within URSEC's current plan, are there alternatives such as those posed by the URSEA to create a permanent Users Committee?
7. Some sections of your website are regularly updated (for example, the section on new legislation). However the sections normally consulted by general public, such as Events, News and Presentations, are very out of date. The last update to the Presentations section was made in 2004 while the Events and News areas were last updated in 2003. Do you consider this site to be a good tool for diffusing this type of information?

8. Researchers and the media generally use websites to obtain information that will later be used to inform and strengthen civil society. How can information related to URSEC and the entire regulatory environment be successfully made available to these people?

C. Consultations and public participation

9. URSEC has carried out various public consultations. What subjects have they addressed (regular citizen participation, technical aspects, revision or introduction of regulation, etc)? How does URSEC evaluate the effectiveness of these tools? How does URSEC rate the participation of actors and citizens in these consultations (quantity, quality)?
10. Will public consultations be maintained as a mechanism for regular participation? Have other complementary mechanisms been considered? Which ones?

II. Questions for groups that seek to influence decision-making in the regulatory process

1. What is your organisation/institution interested in and what actions has it undertaken relating to broadcasting and telecommunications? Are you interested in somehow influencing regulatory policies? How do you plan to do so?
2. To what degree do citizens make their voices heard concerning these matters (how many interventions received, what type of interventions, etc)?
3. What kind of experience has your organization/institution had with URSEC? What is your opinion of this experience? Describe the opportunities and difficulties, positive and negative, that you have experienced or understood to be have been encountered by other social actors.
4. Suggest institutional procedures and mechanisms that can be created and improved to make regulatory processes more inclusive and participatory.
5. What sort of information should be made available to facilitate civil society participation in regulatory processes and to make this participation more efficient?
6. Do you have access to this kind of information? How?
7. Do you believe you have access to the proper URSEC staff members?
8. Has your organization/institution participated in public consultation processes initiated by URSEC?
9. How can they be improved?
10. Does your organisation receive funding or some other type of support to facilitate your participation?

Appendix 3 – URSEC Mission, Objectives and Principal Functions

Mission

The Unidad Reguladora de los Servicios en Comunicaciones (URSEC) is vested with the authority to regulate and control activities related to telecommunications, including all transmission or reception of signs, signals, writings, images, sounds and information of any nature, by cable, optical media and other electromagnetic systems and, likewise, all that is related to the admission, processing, transport and distribution of correspondence carried out by postal operators.

Objectives

The principal objectives of URSEC are the following:

- extension and universal access of services;
- promotion of knowledge;
- control of pertinent monopolistic activities;
- application of tariffs based on economic costs;
- cultivate optimal levels of investment;
- protection of users rights.

Principale functions

- to advise the Poder Ejecutivo (Executive Branch) on the development, instrumentation and application of communications policy;
- ensure the satisfaction of specific sectoral regulations;
- administer, defend and control the national radio spectrum;
- grant licenses for the use of frequencies within the national radio spectrum;
- control the installation and function, as well as the quality, regularity and range of all telecommunications services, be they public or private service providers;
- formulate regulations for the technical control and adequate management of telecommunications, as well as control their implementation;
- implement rules and industry standards that assure the compatibility, interconnection and interoperability of networks, including the public network, as well as the correct and secure function of the equipment that connects to them, thus controlling their application;
- present draft regulation and a unique explanation of criteria and conditions for the licensing of radio frequencies;
- engage in technical and operational supervision of radio and television emissions whatever the modality;

- maintain international relations with communications organizations;
- advise the Poder Ejecutivo (Executive Branch) with respect to the requirements that must be satisfied by whatever actors fall under its jurisdiction;
- consider, within the procedures of concession and licensing, that the provision of services be based on principals of public availability, equality and concurrence;
- ensure the satisfaction of juridical and technical norms by public and private service operators;
- protect the rights of users and consumers;
- determine tariffs and prices;
- promote arbitrational solutions for differences encountered between market bodies;
- apply prescribed penalties.

Regional Regulation of Telecom Markets in the Organisation of Eastern Caribbean States

Andrew Barendse

1. Introduction

The emergence of regional regulation in its different forms over the past decade seemed to signal the arrival of a new regulatory function, one that could be considered as distinct from the regulatory functions performed at national and international levels. Developments in this regard have raised issues around appropriate regional regulatory models to support market reform initiatives and the transition to competitive markets. Regions such as the European Union (EU) and the Southern African Development Community (SADC) illustrate different models adopted depending on the political, social and economic setting. In this chapter we discuss the regional model adopted by the Organisation of Eastern Caribbean States (OECS), as well as the market reform initiatives accompanying the model.

The OECS model provides for the centralised adoption of policy, the centralised and decentralised implementation of policy, and the centralised and decentralised enforcement of policy. At its core was the establishment of a regional telecom authority tasked with coordinating the implementation of telecom policies across the region. Our objective is to describe and analyse the early experiences of regional regulation in the OECS and to assess the implications of its regulatory model on industry development across the region.

1.1. Background to the OECS

The OECS is a nine-member grouping of states in the Eastern Caribbean, comprising Antigua and Barbuda, Dominica, Grenada, Montserrat, St Kitts and Nevis, St Lucia and St Vincent and the Grenadines as full members; and Anguilla and the British Virgin Islands as associate members. This area is regarded as a single internal market governed by an authority

comprised of the heads of state of the different islands.¹ Five of the nine member states – Dominica, Grenada, St Kitts and Nevis, St Lucia and St Vincent and the Grenadines – have signed a separate treaty within the framework of the OECS establishing the Eastern Caribbean Telecommunications Authority (ECTEL). The goal of the ECTEL Treaty is to promote the growth and development of a regional telecom market across the five islands.

The OECS represents an emerging and economically middle-income region. The combined population of the sub-region was slightly less than 600,000 at the time of the case

Figure 1. Map of the five OECS states (Dominica, Grenada, St Kitts and Nevis, St Lucia and St Vincent and the Grenadines) that make up Eastern Caribbean Telecommunications Authority



study. In terms of economic growth, the region as a whole is experiencing reductions in GDP growth rates. The region's economy is slowing down, while shifting from a traditional agricultural base, centred on exports of bananas, sugar, citrus fruits and spices, to a greater emphasis on services, especially tourism, financial services like offshore banking, and the information technology industry. The need to promote diversification has been forced upon the region by a combination of factors, including natural disasters, the loss of preferential trade treatment for agricultural products, and competition from Latin America.

1.2 Performance indicators of the OECS telecom industry

With respect to telecom revenue size, the market for telecom services in ECTEL states increased to XCD 676 million² as of March 2005. This represents an overall CAGR of 6% over 2001.

As for telecom services, there has been a decline in the market for fixed lines and a rapid expansion in the mobile market, while the market for Internet has remained relatively low since liberalisation. Between March 2002 and March 2005, the number of fixed subscribers declined from 152,940 to 127,948, the number of mobile subscribers increased from 37,922 to

300,000, and the number of Internet subscribers increased from 18,300 to 33,000.

Increased telecom sector investment in the region³ came hand-in-hand with the awarding of operating licences. In general, direct investment in the telecom sector has been significant within the ECTEL states and increased steadily over the period from 2001 to 2004, from XCD 128.66 million (2001), to XCD 127.65 million (2002), to XCD 240.90 million (2003), and finally to XCD 285.62 million (2004).⁴ This investment has come primarily from the roll-out of new infrastructure. Cable and Wireless (C&W), the incumbent, was the biggest investor over the four-year period, providing XCD 389.36 million of the XCD 782.83 million total. Of all the islands, investment has been greatest in St Lucia (XCD 267.2 million), followed by Grenada (XCD 183.4 million), St Vincent and the Grenadines (XCD 188.45 million), Dominica (XCD 106.63), and St Kitts and Nevis (XCD 37.6 million).

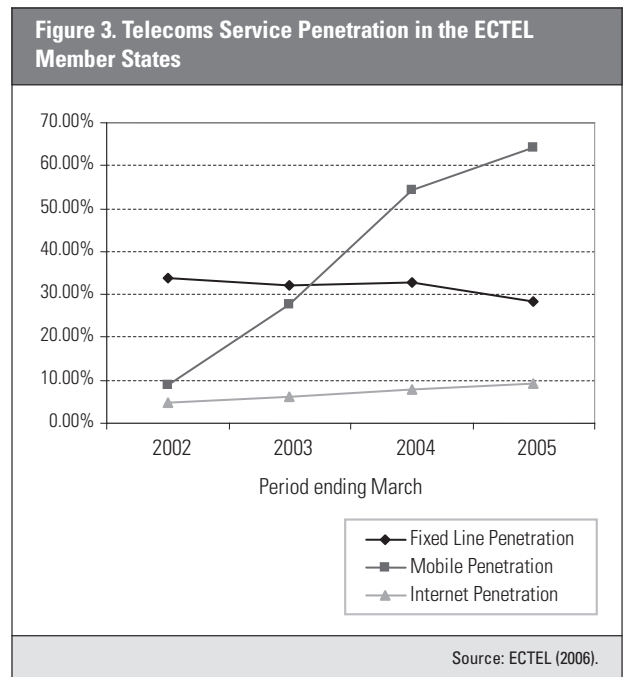
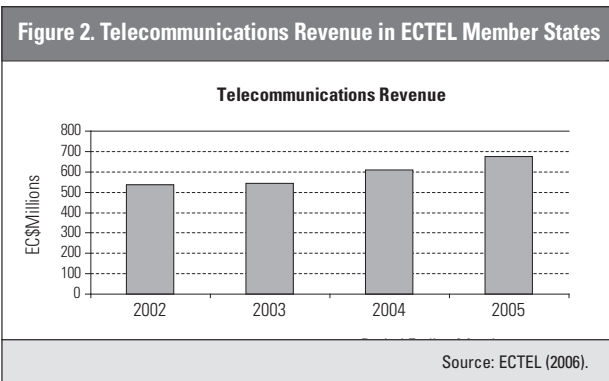
1.3 History of the OECS telecom industry

The telecom industry in the OECS has a long history characterised by a dominant operator. The provision of telecom services was ensured by C&W, which enjoyed a legal monopoly in all markets until 2000. C&W was exempted from private company law provisions, but was subject to restrictions on the range, amount and prices of the services it provided. The structure and level of prices were regulated by the respective national governments of the OECS to meet social goals and conform to constraints on rate of returns and universal service obligations. On some islands, the scope of C&W's monopoly

Table 1. GDP and human development indicators for the ECTEL member states

Country	Gross domestic product		Human development indicators	
	GDP (PPP) per capita (2005)	Rank	Human Development Index (2003)	Rank
Dominica	USD 6,520	91	0.783	70 – medium
Grenada	USD 8,198	72	0.787	66 – medium
St Kitts and Nevis	USD 14,649	47	0.838	49 – high
St Lucia	USD 5,950	98	0.772	76 – medium
St Vincent and the Grenadines	USD 7,493	82	0.785	87 – medium

Source: Wikipedia (2005); UNDP (2005).



covered fixed voice and mobile services, infrastructure, data and value-added services, Internet and satellite services. In some instances where its licences were terminated, the Eastern Caribbean governments were obligated to buy back its assets, creating a costly disincentive for these governments to interfere with C&W's private monopoly.

By 2000 the OECS Authority was dissatisfied with C&W and the services it provided. For example, the governments held minimal regulatory powers while C&W enjoyed the key powers that should typically have been invested in a regulator. Vague, ambitious and outdated telecom policies and licensing agreements were prevalent throughout the islands. The joint venture arrangements between C&W and the states of Grenada, Dominica and St Kitts and Nevis were inconsistent and confusing for all participants. C&W is a privately owned company with none of the OECS states holding shares in it. The state governments only received small returns in terms of royalties, licence fees, and dividend payments for joint venture agreements including the use of radio spectrum, the payment of customs duties and taxes, and the use of government property and land. In one instance – the case of Dominica – C&W's monopoly extended until 2020.

Dissatisfied with the C&W monopoly, the national governments began to look for ways to introduce competition into the telecom market. High ideological and political value had been attached to competition and to establishing pro-competition regulations. The credibility of this commitment was further underscored by the OECS obtaining a World Bank loan to establish competition in its telecom markets.⁵ The decision to develop a single internal competitive telecom market was seen as an important step towards regional economic integration, through which the telecom sector would bring about economies of scale, and was expected to provide better access to capital, i.e., to World Bank loans.

The OECS Authority's commitments to the World Bank allowed the OECS states to access World Bank expertise and obtain international support for their reform efforts. This access allowed the OECS states to at least attempt to match the expertise and experience of C&W, especially during crucial negotiations regarding autonomy and reducing monopoly within the telecom sector. In many respects the World Bank loan provided the OECS Authority with the confidence to embark upon aggressive pro-competition reforms. The OECS states had to repay the World Bank loans, and this could best be done by implementing real reform and development of the telecom sector. In this way, the OECS could generate profits that could be used to make loan repayments.

In the case of the OECS, those creating a single internal telecom market could build on the close cooperation already existing among the member states in such wide-ranging fields as banking (through a common central bank), sport (through regional cricket teams), and law (through the Eastern Caribbean Supreme Court). The trust that had been generated with these undertakings was easily brought to bear on the OECS telecom project. It was therefore relatively easy for the

national governments to delegate control to a multi-state authority like the OECS Authority through the ECTEL Treaty, in which a joint commitment was made to repay the World Bank loan.

2. Institutional reform initiatives in the OECS

This section briefly reviews the OECS telecom market reform initiatives, which comprise the formulation of the OECS telecom policy framework, the liberalisation of the OECS telecom markets, the creation of ECTEL as a regional regulator, the harmonisation of regulatory principles across the OECS, and the design of the OECS regulatory system of governance.

2.1 Formulation of the OECS telecom policy framework

On 5 May 2000 the heads of state of OECS members Dominica, Grenada, St Kitts and Nevis, St Lucia and St Vincent and the Grenadines signed the ECTEL Treaty.⁶ The treaty recognises the need for a harmonised approach to the regional management of the telecom sector. Its purpose, as defined in Article 4, is to promote liberalisation and competition in telecommunications, harmonised policies on a regional level, universal service, and fair pricing through the use of cost-based pricing methods by telecom providers, among other objectives. The authors of the treaty sought to achieve these objectives by establishing a regulatory body called the Eastern Caribbean Telecommunications Authority (ECTEL). ECTEL was created to deal with telecom liberalisation throughout the nine OECS member states, and was mandated to act on behalf of the heads of the member states. As such, ECTEL was required to harmonise and advise the individual National Telecommunications Regulatory Commissions (NTRCs) of its member states on matters concerning telecom sector liberalisation, and to promote collaboration and coordination within ECTEL. The NTRCs were expected to take all the appropriate measures to ensure implementation of ECTEL policy and recommendations. The treaty also defined the structure of ECTEL, of which the three key institutions are the Council of Ministers, the Board of Directors and the Directorate.

ECTEL was tasked with producing a telecommunication bill that could be transposed into national legislation as the telecom act for each of the member states. The telecom acts were passed in the ECTEL states to provide a new legal telecom framework that could be used as the basis for liberalising the telecom sector in the ECTEL area. From the viewpoint of delegation of responsibility, the treaty was significant in that it served to legalise the act of delegation.

The Telecommunication Bill (2000) and the subsequent transposed telecom acts in the member states were also designed to create the NTRCs as the means by which the objectives of the acts would be fulfilled. The NTRCs were established subject to the direction and control of the ministers responsible for telecom throughout the ECTEL states. The ministers were empowered to nominate five commissioners to

serve on the NTRC. Lastly, the national telecom acts made provisions for a number of regulations to be published, notably the Licensing and Authorisation Regulations and Tariff Regulations, both enacted in 2002.

2.2 Liberalisation of the OECS telecom markets

In the OECS area the move from monopoly to competition was characterised by a series of negotiated agreements between the incumbent and the OECS Authority, which culminated in the simultaneous opening up of fixed and mobile markets across all the islands.

2.2.1 Negotiated agreements between Cable and Wireless and the OECS Authority

The development of the OECS telecom policy framework can only be understood in light of the binding agreements made between the incumbent C&W and the OECS states. As of 2006, a total of three agreements had been signed, in 2001, 2002, and 2004. The agreements are significant in that they operationalised the Act of Delegation and enabled ECTEL to act as an official body. The first agreement (2001), called the Memorandum of Understanding (MOU), resulted in the partial liberalisation of the telecom sector.⁷ The second agreement (2002), called the Amendment to the MOU, effectively ended the partial liberalisation of the telecom sector and moved the sector into full competition.⁸ The third agreement (2004), called the Price Cap Implementation Plan, set the foundation for an incentive-based rate regime for all participating states.⁹

The MOU of 7 April 2001 followed the completion of the reform project that culminated in the signing of the ECTEL Treaty, the formulation of new model legislation, and the creation of a means by which harmonised regulations could be promulgated. The agreements were intended to ensure a smooth transition to a fully liberalised competitive telecom sector, which would have far-reaching consequences for the exclusivity of C&W's licence rights and its monopoly in the sector. The first agreement contained key resolutions with respect to liberalisation. First, the telecom sector would be liberalised on a phased basis. Phase 1 would begin on 1 April 2001 and would last for no less than 12 months and no longer than 18 months. Under Phase 1, the following services would be licensed: domestic mobile network operations, resale of international switched minutes, very small aperture terminal (VSAT) services for call centres, and Internet services provision. In essence, Phase 1 of the agreement was directed towards C&W's network. Another provision dealt with the development of joint working groups comprising representatives from the OECS and C&W. One of the key groups was the tariff and rebalancing group. A further provision was the granting of new non-exclusive operating licences for C&W to provide the same network and services as provided by the company at the time the agreement was signed. Finally, the member states had to amend their telecom acts to ensure that C&W's existing licences did not expire before 30 September 2001.

The second agreement of 20 May 2002 was considered to be a follow-up to the MOU. Negotiations within the working group on tariffs had broken down and the OECS ministers spearheaded a new agreement with C&W. A key aspect of this agreement was Annex F, which set out the pricing rules to be adopted and provided for adjustments in the rates and tariffs charged by C&W for selected services. The agreement specified a new Annex F for C&W's fixed license. While the second agreement contemplated defining a process to develop price cap regulation, no guidance was provided as to how this was to be accomplished. The fall-back provision established in Annex F was its most critical component. In the event of ECTEL being unable to implement a price cap plan, this mechanism permitted annual increases of up to 20% for certain services, including line rentals, local call charges, fixed-to-mobile charges and connection charges. A principal output of the second agreement was an interim pricing mechanism which provided for transitional rates and pricing, effective until the implementation of a price cap regime to be brought in on 1 March 2003.

The third agreement of 30 July 2004 was entered into during a time of key judicial reviews. First, the various court cases between C&W and ECTEL arising from this process were resolved, all in C&W's favour. Second, there was an ongoing jurisdiction proceeding in Dominica to establish the rights of the NTRCs to regulate C&W's dominance in telecom services. Third, the dominance proceedings with regards to ECTEL services were still underway.

2.2.2 Granting access to competitive operators in the OECS

The granting of access to competitive operators was tightly managed in the sense that the initial number of licences (19 in total) was awarded by the OECS Authority through an administrative procedure comprising a dual licensing process. Under the new policy framework, telecom operators are subject to a rigorous licensing process involving ECTEL and the NTRCs. New applicants are expected to request authorisation to provide telecom services from the NTRC of the island in which they wish to operate. This application is then forwarded to ECTEL, which makes recommendations that are passed back to the relevant NTRC. If the recommendation is positive, the telecom minister of the island then awards the licence. The initial 19 licences for network operators to establish and operate network services were awarded in December 2003. The number of operators varies across the ECTEL states and includes five in Dominica, four in Grenada, and three each in St Kitts and Nevis, St Lucia and St Vincent and the Grenadines.

The major telecom competitors in the region are the incumbent, C&W West Indies, and Digicel. C&W has dominance in the fixed markets while new entrants like Digicel have increased their presence in mobile and broadband. Digicel, which operates in 22 markets spanning the English-speaking West Indies, the French West Indies and the Dutch Caribbean, is the largest GSM mobile operator in the region, with an average market share of 60%.

2.2.2.1 NUMBER OF LICENCES GRANTED IN EASTERN CARIBBEAN TELECOMMUNICATION AUTHORITY COUNTRIES

The awarding of the initial licences was preceded by a debate among the ECTEL states on the number that could be issued.¹⁰ It was argued that limitations existed regarding the allocation of sufficient frequencies for spectrum-dependent applications. Operators that wanted to invest argued that the number of licences awarded should be limited to ensure a suitable return on their significant capital investment. Due to the size of the market, it was deemed necessary to limit the number of individual licences granted for fixed and cellular services in each member state. An impact assessment carried out on behalf of the OECS Authority confirmed that this would be the most prudent approach. In the end, ECTEL used an administrative procedure to limit the number of licences granted.

The Council of Ministers (COM) agreed to consider all interested parties and set a deadline of 30 January 2002 for the submission of licence applications. In total, the COM received 34 applications for individual licences, 27 for class licences and 18 for frequency allocation. Evaluations were conducted by ECTEL for services falling under individual licences, and a short list of successful applicants was approved by the ECTEL Board of Directors. The final recommendations for the awarding of licences were made by the COM.

C&W, the incumbent, was granted licences in all member states in 2001. This was a significant measure, as it served to eliminate contention with the former monopoly operator. When the new framework of 2000 was introduced, C&W was deemed to have operating licences and was therefore the first to receive its licences, while all subsequent new entrants were subjected to the new licensing process. The awarding of licences to new entrants proceeded at varying paces in each of the five ECTEL states. Table 2 shows the individual licences that have been awarded to date.

2.3 Creation of ECTEL as a regional regulator

The opening up of the market in the OECS was accompanied by the simultaneous setting up of a regional regulator (in St Lucia) and national regulators on each of the other islands. The following discusses the emergence of ECTEL and then turns to a discussion of its stated aims and objectives.

2.3.1 The emergence of ECTEL

ECTEL emerged as a top-down, donor-funded, World Bank-sponsored initiative. ECTEL was initially conceived in the OECS Telecommunications Reform Project, created by the ECTEL Treaty, and inducted in subsequent acts and agreements.

The idea to establish a regional regulatory authority evolved from the OECS Telecommunications Reform Project sponsored by the World Bank in 1998.¹¹ The five OECS contracting states negotiated and signed a project agreement that included a loan of USD 6 million from the World Bank, complemented by USD 4 million counterpart funding from the participating states. The loan was divided equally between the

participating states and a separate project agreement was signed to give the OECS Secretariat administrative responsibility for the project administration.

A key driver for creating ECTEL was the need to strengthen the capacity of the member states to negotiate with the incumbent operator. While the position of the OECS had always been to negotiate with C&W as a group, the creation of a regional body would enable the member states to do so more effectively, particularly on the issue of seeking a common date for termination of existing C&W licences. Member states had hoped to do this in such a way that C&W would not seek compensation for the loss of its exclusive rights. A second driver was the need to address regulatory matters within the OECS. This ranged from reforming outdated laws, licences and agreements to terminating the exclusive provision of all main services by the incumbent operator C&W. Other major issues included reducing unbalanced profits, which were not cost based and thus led to excessive profit margins, and the adverse effects of monopoly provision, such as the failure to introduce new services and improve the quality of services already provided.

The OECS telecom sector reform project became effective on 10 October 1998, and its offices are located in Castries, St Lucia. The objective of the project was to introduce pro-competition reforms in the telecom sector and increase the supply of informatics-related skills in the five World Bank-supported OECS countries. The project aimed to establish an independent regional regulatory authority within two years, and to pass new sector legislation in each participating country within the three years of project effectiveness. A key component of the project was modernisation of the telecom policy framework. Deliverables included a framework to facilitate sectoral reform

Country	Fixed Telephony		Mobile telephony	
	Fixed Licenses	Main players	Mobile Licenses	Main players
Dominica	3	C&W, SAT Telecoms, Marpin	3	C&W, Digicel, AT&T Wireless, Orange Caraibe
Grenada	3	C&W, Global Network Providers Inc., Trans-World Telecom Caribbean Ltd.	5	C&W, Digicel, Global Network Providers Inc., Trans-World Telecom Caribbean Ltd, AT&T Wireless
St Kitts and Nevis	2	C&W, The Cable	3	CariGlobe, AT&T Wireless, C&W
St Lucia	1	C&W	3	C&W, Digicel, AT&T Wireless
St Vincent and the Grenadines	1	C&W	3	C&W, Digicel, AT&T Wireless

Source: Stern (2006).

through changes in regulation, designing new telecom legislation, and establishing a coherent licensing regime and an appropriate regional regulatory authority. The most critical function of the project management unit was to transform itself into the new regulatory body. The establishment of this new body was intended to enhance financial management processes and internal controls within the area. This would facilitate the transition of oversight from the OECS Secretariat to the new ECTEL governance structure. Four areas of activities were undertaken and mandated by the OECS Authority: development of the policy framework and regulatory instruments, spectrum management, cost analysis and development of tariff policy, and technical assessment of the network.

The project was unique in the sense that five independent states would give up some measure of independence to establish a regional regulatory body. The organisation was established by a treaty signed in St. George's, Grenada on 4 May 2000; the ECTEL Directorate, or Secretariat, is located in Castries, Saint Lucia.

2.3.2 Aims and objectives of ECTEL

ECTEL's aims and objectives are contained in the treaty signed in May 2000 by the OECS member states of Dominica, Grenada, St Kitts and Nevis, St Lucia and St Vincent and the Grenadines. The treaty clearly defines ECTEL's purpose, functions and powers. Essentially, ECTEL is expected to harmonise and advise the individual NTRCs in its member states.

In terms of functions, ECTEL is responsible for:

- harmonising and coordinating telecom policies in its member states;
- managing and regulating telecom or radio spectrum;
- ensuring a competitive environment for telecom services;
- working towards the provision of affordable, modern, efficient, competitive and universally available telecom services to the people of its member states; and
- advising NTRCs and governments on matters relating to telecom and spectrum, including regional policy, types of telecom services, licensing, fees, pricing, and management and provision of universal service.

Each of the member states agreed to collaborate and coordinate with each other and with ECTEL to take all the appropriate measures to ensure the implementation of ECTEL policy and recommendations and to finance its efficient operation.

2.3.3 ECTEL's system of governance

ECTEL enjoys discretionary capacity when carrying out its functions of advising member NTRCs, managing regional radio spectrum, recommending regional policy, and so forth. The decisions made by ECTEL are not contingent on approval by the OECS Authority or the NTRCs of the participating member states.

The OECS Authority exercises control over ECTEL mainly through actively and formally monitoring ECTEL's activities. The procedures and mechanisms that the OECS has instituted are identified in typical principal agent relations.

The ECTEL Board of Directors is active in the day-to-day activities of ECTEL. In order for the Board to discharge its duties, some members are housed in the same building as the ECTEL managing director and support staff. In a sense, the Board representatives, alongside the managing director, set the ECTEL agenda and work pursuant to that agenda. The Board guides the operations of the Directorate for the Council of Ministers. Board members are nominated from member states and the chair is rotated annually.

According to Article 9 of the ECTEL Treaty, the Directorate is responsible for the day-to-day management of ECTEL. Its responsibilities include making recommendations for, and in relation to, the issues of licences and frequency authorisation, and the management of the ECTEL fund, among others. Actual accounting for ECTEL expenses is overseen by the managing director and approved by the Council of Ministers. ECTEL's operations are funded through the ECTEL fund, as well as revenues received in the form of payments related to the management of spectrum.

The ECTEL Directorate is headed up by a managing director who is assisted by a management team and support staff. The managing director was part of the original project management unit team that implemented the initial telecom reform project, and became the managing director of ECTEL upon the satisfactory transition from the telecom project unit under the OECS Secretariat to the ECTEL management structure.

2.3.4 Harmonisation of regulatory principles across the OECS

One of ECTEL's key deliverables was a set of regulatory best practices. These policy documents contained high-level regulatory principles intended to assist the national regulators in implementing their regional policy frameworks. The NTRCs were expected to comply with these regulations and to formulate their own methods of implementation to achieve the espoused regulatory principles. Below, two such regulations – for licensing and tariffs – are discussed.

2.3.4.1 REGULATION ON LICENSING

The OECS approach envisaged concurrent processes with regards to the issuing of licences. Licensing is considered to be a joint competency shared between the NTRCs and ECTEL. In this relationship, ECTEL provides overall guidance and support to the NTRCs.¹² The dual licensing process consists of different steps. First, applicants apply for licences in the local NTRC offices on the island in which they hope to operate. Second, the national regulatory authority forwards the applications to the ECTEL office in St Lucia. Third, ECTEL evaluates the request and makes a recommendation on whether to award the licence or not. Lastly, the telecom minister of the respective island awards the license or does not, based on ECTEL's recommen-

dation. In the case of the OECS, the ministers' discretion not to approve a licence is limited to procedural matters regarding the selection and evaluation process. ECTEL retains the responsibility for renewing the licence and is responsible for monitoring and enforcing compliance with licence conditions.

In the OECS case, both the incumbent operator (C&W) and the new entrants were issued operating licences. The incumbent received its licences outside of the competitive selection process used to select new entrants. In total, four licence categories were awarded in the OECS.¹³ These categories range from individual licences, for the provision of general network services; class licences, comprising A (value-added services), B (various radio licences) and C (type approval and wiring); frequency authorisation licences, required in addition to either individual or class licenses; and special licences, issued only on an emergency basis. For purposes of our case study, we examined individual licences and class A licences.

The ECTEL licensing procedure provides a local one-stop shop for all applicants. Local as well as transnational operators are obligated to apply for licences in each of the islands in which they wish to operate. Consistency seems to be applied at the regional level since all applications are forwarded to ECTEL for consideration and review. The approach also seems to harmonise the licence fees for all ECTEL members. The application fees for mobile public, fixed public and Internet services are the same for each of the islands. The approach also affords flexibility in allowing islands to advance national interests while at the same time allowing the OECS to advance regional interests. Operators are assured of consistency in practice. The national regulators draw on regional expertise and ECTEL draws on national expertise.

2.3.4.2 REGULATION OF TARIFFS

In the case of the OECS, the regulation of tariffs includes the implementation of a new price cap plan. This became the basis for much litigation within the context of the liberalisation process in the OECS. For example, C&W commenced litigation against four of the five participating NTRCs. In all of the cases, the courts decided in favour of C&W.

The importance of regulating tariffs was identified in all initial discussions and deliberations. As early as 1998, the World Bank-sponsored OECS Telecommunications Reform Project identified the need to reform tariffs in the region. World Bank Project Report No. PID5165 noted that the prices charged by the incumbent monopolies were in excess of the prices in states with sector competition. Two of the three performance indicators used to assess the effectiveness of the project were competitive prices and the development of cost-orientated methodologies for pricing telecom services. The ECTEL Treaty (2000) identified as one of ECTEL's purposes the need "to promote fair pricing and the use of cost-based pricing methods by telecommunications providers in the Contracting States." (Article 4e). Another of ECTEL's functions was stated as: "to recommend a regional cost-based pricing regime for implementation by each Contracting State".

The 2001 MOU provided for the creation of a tariff and rebalancing working group, comprised of representatives from C&W and the OECS team. The working group was required to negotiate with a view to arriving at an amicable termination of existing C&W licences in the respective member states. The terms of references included determining appropriate tariffs and making recommendations with respect to setting initial tariffs, and reviewing existing rates and proposals for rebalancing. In terms of methodology, the group was expected to make decisions by consensus. Due to a conflict of interest between C&W and the OECS members, negotiations within the group eventually broke down. The agreement reached on 29 May 2002 between the OECS and C&W resulted in an interim pricing mechanism, which provided transitional rates, effective until the implementation of a price cap regime. A price cap regime was expected to be in place by 1 March 2003, after which C&W would be entitled to raise local rates by a maximum of 20% per annum.

In the negotiated price cap plan, residential access line rates are specified, while business access line rates can only increase by inflation in any given year. The remaining regulated services must be reduced by a productivity factor of 2.5% per year, less inflation. International and mobile services were not included in the price cap as they were considered to be sufficiently competitive and therefore not to require regulation. The price cap plan also included concessions of an estimated USD 7.5 million for operators over the first two years of the plan. These took the form of reductions in fixed-to-fixed national calling rates, fixed-to-mobile national calling rates, and the inclusion of a significant number of free fixed-to-fixed national calling minutes with fixed C&W residential monthly metered rentals (ECTEL, 2004).

This approach to tariffs reduced the cost of the available telecom services, particularly in the long distance and cellular markets. For example, the average price per call from the region to the United States has fallen by more than 70% since the start of the liberalisation process. In 2000, calls to the US from the region averaged XCD 3.25 per minute, compared with XCD 0.90 per minute today. According to ECTEL, a further anticipated benefit of the new price cap plan¹⁴ will be to provide a significant reduction in costs for C&W fixed line consumers.

It was proposed that off-peak and weekend rates would further decrease to XCD 0.04 per minute on 1 January 2007. Beginning 1 January 2005, residential fixed customers were to

Table 3. ECTEL price plan

	1 January 2005	31 December 2006
Local calls (peak period)	XCD 0.09 per min.	XCD 0.07 per min.
Local calls (off-peak period)	XCD 0.07 per min.	XCD 0.05 per min.
Local calls (weekends)	XCD 0.06 per min.	XCD 0.05 per min.

receive 60 free minutes of local fixed-to-fixed calls after 8:00 p.m. and during weekends.

The new agreements, however, came at a cost. A full price cap regime would only become fully operational in 2006. Therefore, although ECTEL succeeded in obtaining regulatory harmonisation with regard to no further increases, it failed in its quest to protect consumers and other telecom providers who had to rely on C&W for non-cost based pricing. ECTEL therefore failed in its key role of facilitating the provision of affordable telecom services and in its objective of imposing cost-based regulation on C&W.

2.4 Design of the OECS regulatory system of governance

2.4.1 The process of regulatory decision-making in the OECS

Broadly speaking, the national telecom ministers adopted regulatory principles on a regional level, which they were expected to transpose into national legislation. ECTEL and the NTRCs were expected to implement all legislation, while the Eastern Caribbean Supreme Court (ECSC) and national courts were expected to enforce all legislation. This is a hybrid model in the sense that it is neither purely governmental nor purely market driven. Government provides the formal institutions, i.e. policy framework and model regulations, and the supporting structures, while firms are allowed to negotiate commercial contracts – for example, on interconnection terms, conditions and costs – between themselves pursuant to these formal institutions.

2.4.1.1 ADOPTION OF TELECOM REGULATION IN THE OECS

The OECS telecom policy was formulated by the OECS Authority, which consists of the prime ministers and chief ministers of the constituent islands and is the highest decision-making body of the Organisation. The policy formulation process was initiated by the heads of government and coordinated by the Secretariat.¹⁵ The policy outcomes are binding for participating member states, and include the ECTEL Treaty, the Telecommunication Bill, and the three agreements between the OECS and C&W.

Member states are responsible for transposing regional model policies and regulations into national legislation. National governments transpose regional legislation into national laws through their respective national regulatory processes, national parliaments, committees, ministries, government agencies, and so forth. Regional policy is considered law only when it has been transposed into national legislation in the member states. Policies that have been transposed include the telecom bill and regulatory instruments like the ECTEL decisions regarding price cap regulation and numbering.

2.4.1.2 IMPLEMENTATION OF TELECOM REGULATION IN THE OECS

The NTRCs are sector specific regulators established under the Telecommunication Bill to regulate and maintain the development of the telecom sector of the member states. These authorities were created in 2000 as the key telecom implementation agents. Their functions and powers are stated in their local telecom acts and can be summarised into the following broad categories: sector regulation; sector administration of policy, especially with respect to licensing; revenue collection and management, including the collection of fees and tariffs; and adjudication, as a tribunal. They also play an advisory role for the respective member state telecom ministers.

2.4.1.3 CONTROL OF TELECOM REGULATION IN THE OECS

Telecom policies that have been formulated by the OECS and transposed into national legislation are enforced by the NTRCs and the national courts. In the case of the OECS, enforcement of telecom matters is also done through a regional judiciary agency, the Eastern Caribbean Supreme Court (ECSC), which was established in 1967 by the West Indies Associated States Supreme Court.¹⁶ The ECSC has unlimited jurisdiction in the member states to make rules of court for regulating the practice and procedures of the Court of Appeal and the High Court. The national legislations in the states served by the Court confer rule-making authority on the ECSC Chief Justice in relation to matters outside the Court of Appeal and the High Court. To date, national courts have made numerous rulings on matters of dispute between ECTEL and C&W.

The institutional structures of the OECS telecom sector can be considered to be innovative since the creation of the NTRCs was preceded by the functioning of a regional regulator. The ECTEL Treaty created the NTRCs and legitimised ECTEL simultaneously. At the time, ECTEL was functioning in the form of a regulatory unit for the World Bank project. This situation is unique to regional regulation. In other regions, national regulators have been set up first, with regional regulators growing out of cooperation between NRAs. In the case of the OECS, the NTRCs were set up with the express view of relating to the regional organisation and being supported by it. In this regard, ECTEL's decisions are to be considered important inputs to all NTRC decisions at a national level. The NTRCs often look to ECTEL for guidance given its greater experience with regulatory matters. From the outset, there was a strong regional orientation in the OECS region, as opposed to a national orientation.

2.5 Assessment of the institutional effects in the OECS

We examined the institutional reform initiatives in five parts: the formulation of the OECS policy framework, the liberalisation of telecom markets, the creation of ECTEL to act as a regional regulator, the harmonisation of regulatory principles across the OECS, and the design of the OECS regulatory system of governance. Below we summarise these issues and discuss the implications of this experience for regional regulation and its impact on sector performance within the OECS.

2.5.1 Formulation of the OECS telecom policy framework

The OECS policy framework spelt out a clear policy for regional regulation. The ECTEL Treaty of 2000 recognised the need for a harmonised approach to the management of telecom in the region. The regional policy framework was made legally binding for the participating OECS member states. Virtually all the OECS states perceived the framework to be relevant and cooperated with ECTEL in its implementation. Where the framework has been implemented effectively, the OECS has experienced dramatic growth; where its penetration has been limited – for instance, due to problems with cost-based pricing methods – growth has been limited for the state in question.

Perhaps a contributing factor to the difficulties in implementing the framework has been the relative inexperience of ECTEL and the NTRCs in relation to the experience and information asymmetry in favour of C&W. Even with the support from the World Bank, this information asymmetry served the interests of C&W, which was able to operate in a manner that allowed it to circumvent early regulatory objectives and use this regulation to its advantage.

In addition, the actual policy framework is scattered across various documents and covers different periods, i.e., the ECTEL Treaty and the various agreements with C&W. Moreover, the objectives of the policy framework since its inception in 2000 have been directed towards promoting competition, harmonising policies and developing cost-based pricing methods, and some of these objectives have become largely irrelevant given the progress made in the region since 2000.

Nevertheless, the OECS regulatory objectives have created a number of benefits for regional regulation. In the case of the OECS, emphasis has been placed on the promotion of competition, harmonised policies on a regional level, universal service, fair pricing and the use of cost-based pricing methods by telecom providers. The homogeneity of the region, in terms of economic growth, stages of reform, etc., meant that these issues were considered to be relevant by all the islands' governments.

2.5.2 Liberalisation of the OECS telecom markets

The phased liberalisation of markets created benefits and challenges for regional regulation. The phased opening up of the market was intended to allow all the stakeholders – the incumbent, new entrants and policymakers – adequate time to prepare for competition. However, it soon became evident that the policymakers and regulators were ill prepared for the opening up of the telecom market. Many states had not set in place the relevant regulations as specified in the ECTEL Treaty and telecommunications bill. In addition, many of the early regulatory decisions were successfully challenged by the incumbent C&W in court.

Nonetheless, the simultaneous opening up of the telecom markets across the OECS states was significant from the perspective of regulatory harmonisation. It placed the five participating states on an equal footing with regards to dealing with regulation. In addition, coordination of telecom activities by

ECTEL was relatively easy, as the region is not characterised by large economic disparities.

Market liberalisation benefited sector performance. This was seen in the increase in the number of new entrants across all the OECS islands and in the levels of competition in mobile. Overall, the OECS experienced year-on-year growth, increased investment and employment growth after telecom market liberalisation. In the case of the OECS, it is easy to link these benefits directly to the reform efforts, since it was ECTEL that facilitated the licensing process that resulted in new entrants. These developments would probably not have happened in the absence of reform, given the conduct of the incumbent C&W.

2.5.3 Creation of ECTEL as a regional regulator

The creation of the ECTEL as a regional regulator generated benefits for regional regulation: C&W was compelled to negotiate with ECTEL as a regional authority on regional matters, spectrum, numbering, etc., and to pursue individual terms and conditions with individual member states through the NTRCs. ECTEL provided the means to collectively constrain (to some extent) the dominance of C&W and to provoke it into investing in modern telecom technologies to the benefit of the region. It seems that this result would not have been achieved without the creation of a regional regulator with real powers.

ECTEL's achievements increased its credibility as an institution, as demonstrated by the willingness of member states to adopt, implement and enforce its decisions. In addition, the willingness of states to collaborate with each other and with ECTEL to ensure the implementation of regional policy contributed towards more efficient regulation.

While ECTEL has been promoted as the first regional regulator, in practice its function in the OECS region has been primarily directed towards supporting the NTRCs in their national tasks. In terms of fulfilling its regulatory objectives, ECTEL is perceived to have done well. This can be seen in the manner in which it has addressed matters such as regulatory harmonisation and the licensing process in its management of radio spectrum; the provision of more affordable telecom services; and the extent to which it has advised the NTRCs and national governments on regional policy matters. In terms of stimulating competition, however, ECTEL has been less effective. While levels of competition have increased in some markets, such as mobile telephony in particular, they have remained virtually unchanged in others, such as fixed telephony. To a large extent, ECTEL's ability to bring about change was constrained by the problem of incumbent dominance. The manner in which it responded to C&W with regard to the significant market power (SMP) process and introducing a new price cap illustrates this.

Based on the evidence as a whole, it would seem that the benefits created by the work of ECTEL have far outweighed the problems created. As a regulatory organisation, it has facilitated credible and effective regional regulation. Nevertheless, ECTEL's initial effectiveness has also been greatly reduced by

the market power of the incumbent. Despite receiving real powers, its lack of adequate regulatory tools has undermined any real authority it might have to introduce efficient regional regulation. The formulation of effective regional regulatory tools that can be used to advance the objectives of a regional telecom policy is perhaps the biggest challenge at present for the OECS region.

2.5.4 Harmonisation of regulatory principles across the OECS

The specific harmonised regulations for licensing and a price cap plan created both benefits and problems for regional regulation.

With respect to licensing during the initial opening up of the telecom market, the use of administrative procedures to award fixed and mobile licences accounted for most of the licences granted. The subsequent process has been relatively slow as a result of the decision by the OECS Authority to distribute functions across two levels. The dual competency approach of licensing came at the expense of speed and efficiency. Some in the telecom sector have already complained about the length of time it takes new entrants to obtain a licence. While this dual competency served a useful purpose during the early stages of regulatory reform, it has become a barrier to competition rather than a means of facilitating it. Thus, while the OECS approach has successfully contributed towards unifying licensing, the changes in technologies suggest that this approach will not suffice in the foreseeable future. Already in the EU, for example, licensing regimes have been replaced by simple registration: new entrants inform regulators of their intention to enter the market, rather than requiring permission to do so.

The initial licensing procedure and dual licensing processes used within the OECS region allowed for equity and participation by all, but came at the expense of speed and efficiency. A process once designed to be a conduit for change is now considered to be a barrier to competition. In addition, the introduction of newer technologies such as WiFi and VoIP has rendered access to the OECS regulation unenforceable.

With respect to the price cap plan, the OECS had an extremely difficult time with price regulation during the initial reform of its telecom market. The OECS case shows the challenges that must be faced when establishing a regional price cap regime. After six years of discussions, negotiations and court cases, all that the parties concerned achieved was a decision to delay implementation of a price cap regime. This will have far-reaching consequences for private institutional arrangements such as interconnection arrangements between firms.

Experience in the OECS has shown how asymmetry of information and negotiating power between a strong incumbent like C&W and new entrants yields inefficient results. Once a price cap is implemented, ECTEL will need to reassess the situation for fixed and mobile and fixed-mobile convergence.

The failure to implement a cost-based price cap regime within the OECS region remains a cause for concern. Once a price cap is introduced, and regulators succeed in enforcing it, discussions on wholesale and retail pricing and ex-ante and ex-post design considerations will become important.

2.5.5 Design of the OECS regulatory system of governance

The OECS regulatory regime is characterised by the adoption of principles at the OECS level and by shared implementation and responsibilities for enforcement. In the OECS context, this has taken the form of allocating tasks like spectrum management to ECTEL and leaving most of the other tasks to the national NTRCs, including pricing and interconnection. Licensing, for its part, has been allocated as a dual competency. While the commitment of the national governments to reform is credible, this reliance on the member states and their NTRCs to implement and enforce regulatory policy has weakened regional effectiveness with respect to enforcement of liberalisation measures. This was seen especially in the early stages of the regulatory reform process, when the incumbent C&W was able to exploit the weaknesses within the system. Regulatory effectiveness has at times been compromised by the lack of procedural clarity inherent in the regulatory procedures and the time it took to enforce procedures. In addition, the reliance on courts to handle non-compliance with regulations reduced flexibility, self-regulation and cooperation.

The legality of the policy framework created benefits for regional regulation, since it effectively meant that the OECS members were obligated to transpose regional regulations into national legislation. The NTRCs, with support from ECTEL, were expected to implement the regulations, and the courts, both national and regional, were expected to enforce them. The commitment of the OECS states to establish and enforce national regulations further enhanced regional regulation.

The setting up of ECTEL as the regional regulator created further benefits. Greater coordination became possible as ECTEL worked alongside and in support of the national regulatory authorities. The delegation of functions such as spectrum management and numbering to ECTEL rather than individual states meant that limited resources could be allocated in a more efficient manner. The decision to make licensing a dual competency meant that both regional interests and national interests could be advanced. Individual ministers could accept or reject ECTEL's recommendations given their national market conditions. In general, expertise at the national level was enhanced by advice and support from ECTEL concerning regulatory matters like setting price caps, interconnection, and so forth.

The presence and participation of both the national and regional judiciary as a regulatory tool created benefits and problems for regional regulation. The participation of a regional judiciary enhanced the regulatory situation in the sense that it provided a forum for debate when matters could not be resolved at the national level. The litigation between the incumbent C&W and the NTRCs provides ample evidence of

this. In one particular case, the regional Supreme Court served as a deterrent and a catalyst to negotiation: C&W and ECTEL opted to settle out of court rather than face a negative judgment, as such a judgment had the potential to impact ECTEL's decisions and C&W's operations in other states. In this way, the judiciary assisted in constraining the behaviour of the incumbent while ensuring the consistent application of regional policies. However, the length of time it took to hear cases acted as a constraint on regional effectiveness.

3. Conclusions and policy recommendations

In this chapter we discussed the OECS regulatory model adopted as part of a broader set of regional market reform initiatives. One of the features of the model was its attempt to combine national and regional interests. This allowed national structures to participate alongside centralised structures in all aspects of the regulatory process. For example, national ministers responsible for telecom participated with the OECS Authority in the adoption of policy. At the same time, ECTEL supported the NTRCs in implementing telecom regulations, while the national courts generally take their cue from the regional Supreme Court when addressing telecom disputes. The role of ECTEL was particularly important since it was seen as the mechanism responsible for coordinating OECS telecom policies. In many respects, this approach allayed the initial fears of national authorities when they ceded sovereignty to centralised authorities.

While the system of governance initially set up has served the OECS region well in the initial stages of telecom sector reform, some concerns remain. The manner in which the current policy framework was formulated by negotiations between the OECS Authority and the incumbent serves as a case in point. The lack of transparency may have been necessary and helpful for dealing with the region's incumbent. However, today's changed circumstances require a more transparent and accountable manner of policymaking within the OECS region, especially with respect to participation by all the region's telecom operators. We thus recommend that the policy adoption processes within the OECS be made more transparent and accessible to all stakeholders. In addition, the OECS Authority should improve the process of policy adoption by allowing for the continual reviewing, improving and revising of the regulatory frameworks.

The current system also brings to question the independence of ECTEL with respect to political influences. For example, concerns remain about the role that the Board of Directors has played in the day-to-day running of ECTEL. To ensure sufficient independence with respect to ECTEL, the role and functions of the Board of Directors need to be clarified. The Board of Directors currently runs the day-to-day activities of ECTEL and guides the operation of the ECTEL Secretariat. We recommend that the Board of Directors should be given a set of limited objectives and should focus mainly on procedural issues

rather than occupying itself with operational matters. This would enhance the overall credibility of ECTEL and allow its management to run an effective regulatory organisation. It would also free the ECTEL Secretariat to focus on advancing regional markets without interference from the collective national interests represented by the Board of Directors.

An important question is the extent to which the OECS model of regional regulation is replicable. While some aspects of the model may be transplantable, others may be too specific to the OECS institutional environment. For example, the creation of a specialised regional regulator with real powers may become an important consideration in other regions. In regions such as the EU and SADC, policymakers have opted for high-level coordinating groups rather than formal regional regulatory agencies. The OECS experience highlights the benefits to be gained from such a centralised structure. For one, ECTEL was able to achieve more in its negotiations with the regional incumbent than the previous practice of individual negotiations between each country and the incumbent. The extent to which other regions find the model useful, however, is a function of the specificities of each region's institutional environment. In the case of the OECS, the different member states were more or less on an equal economic footing, have similar histories, and faced a common enemy in the form of C&W.

Notwithstanding the early successes, the OECS case highlights the difficulty of designing a model capable of addressing the problem of incumbent monopoly power across national jurisdictions. The ability of C&W to delay the introduction of a price cap regime, stop the SMP process and use the courts as a source of competitive advantage suggests that the model is unable to constrain the anti-competitive practices of the incumbent. These activities have greatly reduced ECTEL's effectiveness. We recommend that greater support be provided to institutions like ECTEL and the NTRCs. Support should take the form of greater resources (access to experts, training programmes and new regulatory tools) from policymakers to assert their independence and allow ECTEL to at least resolve the problems with respect to pricing and the SMP process.

The OECS case also highlights the difficulty of allocating regulatory responsibilities across national (NTRCs) and regional (ECTEL) levels. While the dual licensing process did allow for equity and participation by all, it came at the expense of speed and efficiency of the licensing process. A process designed to be a conduit for change has now become a barrier to competition. Moreover, the introduction of newer technologies such as WiFi and VoIP has rendered the present access regulation process unenforceable. With respect to access regulation we recommend that the dual licensing procedures be reviewed. The plethora of fixed and mobile licences already awarded in the region suggests that perhaps the time is right for the licensing procedures to be replaced by an authorisations regime. Such an arrangement would only require individual rights of use for scarce resources such as spectrum and numbers.

During the initial stages of regional reform in the OECS, the NTRCs focused primarily on regulating the incumbent. The establishment of some competition in fixed and mobile suggests a change in emphasis from regulating the incumbent to regulating the market as a whole. We therefore recommend a review of the tasks of ECTEL and the NTRCs with respect to their preoccupation with regulating the dominant incumbent. A shift in their focus from regulating C&W to applying standards that enhance competition and opportunities to participate in the market at any level would be more appropriate.

Two decisions are key in this respect. First, the decision to withdraw the assessment into SMP should therefore be restored and the market analysis should be undertaken. This would impose on C&W all obligations required of SMP and operator and would allow for more effective regulation of asymmetric power in the OECS region. Second, the OECS should introduce a price cap regime as soon as possible, and the decision to delay its implementation should be re-examined. The ability of the incumbent to negotiate and fix prices until 2006 has not facilitated the establishment of an effective price cap plan. This decision should be revisited with the view of introducing a rate-based regime as soon as possible. Failure to do so will result in the ECTEL states being locked into an outdated price regime while prices for telecom services are expected to drop steadily elsewhere. Once a price cap is introduced, and the regulators acquire experience with enforcing it, further discussions on wholesale and retail prices and ex-ante and ex-post design considerations would become important.

Notes

¹ The OECS was created by treaty in 1981 when seven Eastern Caribbean countries agreed to promote co-operation, unity and solidarity, to harmonise policies and undertake economic integration among the member states. In 1991 the OECS heads of government agreed to the creation of an OECS single market. Efforts had been directed at removing barriers to the free movement of goods, services, labour and capital, harmonising macro-economic policies and accelerating the economic development of the region. At the 34th Meeting of OECS Heads of Government (July 2001) a decision was made to deepen economic integration by creating an economic union.

² The East Caribbean dollar (currency code XCD) is the currency used in all OECS member states except the British Virgin Islands, which uses the US dollar (USD).

³ For more details, see the impact assessment report on the ECICT Project by USAID/Carana (Carana Corporation 2004).

⁴ This is a projected flow for 2004 based on the entrants of new players. Note: investment pertaining to cable landing licences is not included in the projections.

⁵ For a description of the project see World Bank (1998).

⁶ For more details see OECS Contracting States (2000).

⁷ For a description of the first agreement see OECS Contracting States (2001).

⁸ For a description of the second agreement see OECS Contracting States (2002).

⁹ For a description of the third agreement see ECTEL (2004).

¹⁰ See NTRC St Lucia Annual Report (NTRC St Lucia 2003).

¹¹ For a description of the project status see OECS (2002).

¹² See ECTEL's Guidance Notes on the application for a telecommunications licence (ECTEL, 2002).

¹³ For a description of the telecom bill see OECS Authority (2000).

¹⁴ ECTEL negotiated the proposed price cap plan based on its analysis of current cost data rather than on past pricing data.

¹⁵ Working groups may be created for specific purposes (as was the case with the OECS Telecom Reform Project).

¹⁶ The ESCS is a superior court of record for the nine OECS member states, which comprise six independent states (Antigua and Barbuda, Dominica, Grenada, St Kitts and Nevis, St Lucia, and St Vincent and the Grenadines) and three British Overseas Territories (Anguilla, the British Virgin Islands and Montserrat).

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Multinational Operators in African Mobile Markets

Ewan Sutherland¹

1. Introduction

The early months of 2006 saw spectacular evidence of the vibrancy of the market for mobile telephony in Africa. The Democratic Republic of Congo (DR Congo), Morocco and Nigeria were in discussions with operators about licensing 3G mobile telecoms. Mauritania launched the assignment of a third mobile licence, while Egypt received eleven applications for its third mobile licence. MTN purchased Investcom for USD 5,500 million. If there had been any doubt it was now clear that mobile telephony had truly taken off in Africa.

The success of cellular voice telephony, primarily the global standard for mobile (GSM), has been made possible by the opening of markets to new operators, relegating to history the monopoly provision of fixed networks. In comparison with the sluggish growth and high monthly rentals of fixed telecommunications, mobile operators have attracted large numbers of customers with packages of handsets, calls and text messages that are considered to be affordable by a significant part of the population. To do so they have built substantial networks making significant investments. Competition has been sufficient to push operators to expand even if not always to reduce their prices.

Across the continent there are now many national regulatory authorities (NRAs) that can provide quasi-independent support for markets, though there are still comparatively few national competition authorities (NCAs). The effectiveness of NRAs in implementing pro-competitive policies and in delivering benefits to current and potential customers is unclear and requires detailed analysis. They often have limited independence and some governments continue to shelter incumbent operators from competition, in particular by continuing their monopoly over international traffic (Shehadi 2002). A test case has been Somalia, where there is strong market growth,

low prices, interconnection and competition – all in the absence of a regulator or even an effective government.

There are a significant number of market failings and abuses to occupy NRAs, though some of the work can be reduced through sharing within regional and global networks of regulators. There is a need for considerable support to improve the skills amongst the staff of NRAs and also for consumer protection, in both governmental agencies and associations. These are essential for the accurate analysis of developments on mobile markets. Many of the present skills are in technical aspects of regulation, rather than the application of pro-competitive policies.

A typical problem is the high switching cost for customers in the absence of mobile number portability (MNP). The exorbitant international mobile roaming charges also present a challenge that must ultimately be solved. And a further regulatory problem is the high level of mobile termination rates (MTRs), both a complex issue and one in which the operators are most sensitive. While these rates are generally far above costs, the effects of their reduction needs to be thoroughly understood. For the future, interconnection arrangements need to be designed to avoid such difficult and contentious issues.

Many complaints have been made about poor quality of service and inadequate levels of customer care provider by operators. Such problems arise from the low levels of competition and the high degree of concentration and can largely be addressed by increasing competition.

There are also general concerns about the affordability of mobile telecoms for large parts of the population. It is unlikely that GSM technology can be made affordable for everyone, while remaining viable for operators. Since long-term subsidies will not be affordable, alternative solutions will have to be sought.

Mobile network operators have criticised regulation as restricting investment and for failing to reflect local circumstances. They also criticise regulators for uncritically copying from developed countries, without consideration of local circumstances (PWC 2005). This has to be judged against their global pattern of politico-regulatory gamesmanship.

Africa can be treated as one unit or it can be divided between Middle East and North Africa (MENA) and Sub-Saharan Africa (SSA). It is also possible to divide the continent into the different colonial traditions with Arabic, Anglophone, Francophone and Lusophone groups. However, for mobile telecoms it appears that the larger operators have extended their footprints across Africa and the Middle East, even as far as Afghanistan. It has allowed the operators to spread their risks and to maximise revenues from customers with limited disposable income.

While a few countries in Africa would be considered to have a low political risk, many are characterised by doubt and instability, war and strife. Nonetheless, mobile operators have entered these markets, constructed networks, generated revenues and acquired each other. Changes in government evidently do not result in the loss of licences or disadvantageous changes in regulation.

New challenges arise as we move into an era of broadband and 3G mobile telecoms. It will be necessary to find the content to attract customers and generate the revenues needed to pay for infrastructure and handsets. This is likely to require an entirely different enabling environment with new regulations, including those governing acceptable content.

In the next sections, the performance of fixed networks is briefly analysed, followed by a detailed analysis of the growth of cellular wireless networks in Africa, examining in particular levels of competition and economic benefits. This is followed by an analysis of the large transnational operators: Vodafone, Investcom, Millicom, Celnet, MTN and Econet. Conclusions are then drawn.

2. The fixed network

The lack of competition in fixed networks, in the absence even of a second network operator (SNO) in very many countries in Africa, has meant modest growth and even decline. There has been no business case for the installation of additional copper local loops, with a preference for the construction of GSM networks and, in a few cases, wireless local loops (WLLs). There is not yet a case for the construction of local loops using optical fibre cables, nor does that seem likely in the medium term.

International telephone services have historically been very expensive. Operators have priced calls far above costs, supposedly in order to cross-subsidise fixed line subscriptions and network construction. In many cases international telephony remains a monopoly (World Bank 2004b). The creation of the SAT-3 undersea cable has been little short of a fiasco, with incumbent operators monopolising the capacity and setting

very high rates, which result in extremely low levels of utilisation of its capacity.

Business customers in MENA have complained that their fixed network requirements were not being met in terms of service quality being insufficient for corporate applications; very long lead times; and high prices (World Bank 2002). Unmet demand and poor quality of the demand that is met result in additional inefficiencies. Too often businesses are unable to make optimal use of ICTs.

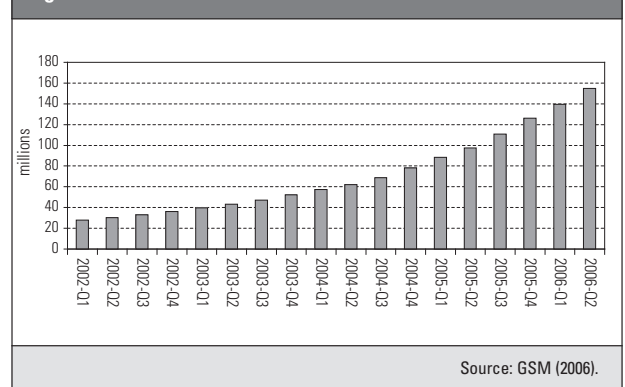
Good telecom services have significant and positive effects on inward flows of foreign direct investment (FDI) and on exports of both manufactured and intermediate goods. Given the poor performance of telecom services, policies that improve their performance should lead to improvements in FDI and exports (Sekkat 2020). The opening of telecom markets to competition can therefore play a catalytic role in easing cross-border constraints on trade (Rossotto et al. 2003).

Both privatisation and competition have led to significant improvements in the performance of fixed network operators. The greatest gains have come from a comprehensive reform program, involving both changes to policies and the support of an independent regulator. The sequence of reforms has been found to be important, with fixed line penetration being lower if competition was introduced after privatisation, rather than at the same time (Fink et al. 2002).

Liberalisation and the opening of markets have promoted the greatest efficiency. Better telecommunications leads to better integration into the world economy which, in turn, leads to strengthening of export performance in manufacturing (Estache and Ana Goicoechea 2005).

The state of fixed network services and markets generally is poor and in extreme cases almost nonexistent. The success of competition in mobile networks has too seldom been followed through by its introduction into fixed networks and, in particular, in the provision of infrastructure and international gateways. The result is that many problems in the rest of the economy are accentuated, when they could be reduced.

Figure 1. Growth of GSM customers in Africa



3. Competition and growth in cellular voice telephony

There has been significant growth of mobile telephony in the last few years (see Figure 1). However, there remain large numbers of people and many groups without access to affordable telephony of any sort. With a total population of almost 900 million, there were still almost 760 million Africans without a mobile telephone at the beginning of 2006 or about 84% of the population.

There is also a small number of CDMA licences, mostly WLL, but also some cellular networks (see Table 1). The CDG reports only about six million customers across Europe, the Middle East and Africa, including both WLL and cellular, so that cellular CDMA customers in Africa are very few in number.

The numbers of customers of mobile telephony are never very precisely measured. There tends to be some overstatement by operators because of individuals with multiple SIM cards, particularly international travellers. Customers will often carry SIM cards for more than one network to improve the likelihood of obtaining service in countries with poor quality of service. Some discipline in reporting is being introduced by anti-terrorist measures, requiring detailed registration of prepaid customers. A further factor is the need to report to financial markets, where overstating customer numbers lowers the average revenue per user (ARPU).

One of the largest contributors to the total is South Africa, with almost 40 million. However, these numbers have been questioned because they seem so high as to be close to saturation. The causes of over-reporting of customer numbers would include special offers on SIM cards (e.g., ZAR 2.00 per card), use by illegal immigrants and more generally in the informal sector of the economy.

There is also understatement of customer numbers arising from simple resale of mobile telephony by individuals which is prevalent in many towns and villages. This is best known from the microfinance model pioneered by Grameen in Bangladesh, assisting telephone ladies set themselves up in rural villages (Knight-John et al. 2005). This model has recently been introduced into Rwanda (Grameen Foundation 2006). Additionally

Country	Operator	Frequency
Angola	Movicel Telecomunicações	800 MHz
DR Congo	Telecel International	800 MHz
Ghana	Kasapa Telecom	800 MHz
Nigeria	Reliance Telecommunications	1900 MHz
Zambia	Telecel International	800 MHz

Source: CDMA Development Group website.²

some individuals have access to telephony through the use of payphones and telecentres on the GSM networks.

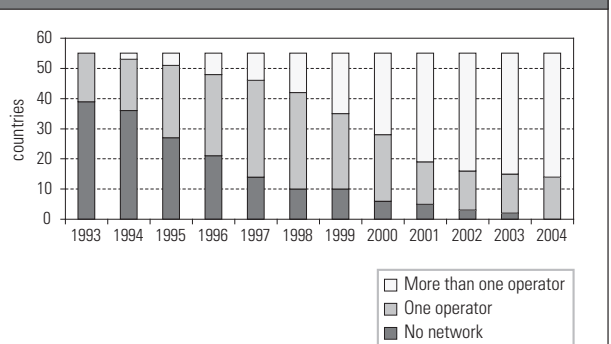
Customers of mobile telephony in Africa are almost entirely prepaid, with no more than 10% and often less than 5% being post-paid subscribers. For example, in Morocco where the total mobile teledensity has reached almost half the population, only 2% of overall teledensity is post-paid mobile, compared with 40% which is prepaid mobile.

The sale of prepaid cards in countless retail outlets results in some additional costs but makes telephony available on a wide scale. Cards are usually available in relatively small incremental units, which suits customers with very limited access to cash. Such purchases also generate revenues for the shopkeepers.

Many countries have markets in more affordable second hand mobile phones. These often overlap with markets for illegally imported handsets, avoiding government duties on electronic goods. In some countries there are also supplies of stolen handsets from the same country and elsewhere, notably from the developed countries.

The limits of the expansion of cellular networks are a mixture of the network construction costs, population density and disposable income. The gross national income (GNI) can be used as a proxy for monthly income, allowing for purchasing power parity (PPP). However, it is necessary to consider the GINI index to take account of the distribution of income among individuals or households. A perfectly equal distribution would have a GINI score of 0 while a value of 100 would be perfect inequality. Literacy rates also affect use of services such as SMS. A heavily urbanised population would require lower network construction costs and lower maintenance than a largely rural population. A worst case scenario would be low income, limited urban population and high GINI, pointing to a small addressable population for cellular voice telephony.

Figure 2. Mobile networks and competition in Africa



Source: ITU (2004).

Table 2 shows the GINI scores and the human development rankings, together with literacy and urbanisation rates for countries in Africa with low human development.

There has been a gradual acceptance by governments that mobile telephony is a commercially viable model and that competition amongst operators was both possible and would accelerate its adoption by customers (see Figure 2). There was further opening of markets to competition in 2005 and 2006, for example, in Swaziland. The significant pool of unmet demand for telecommunications has been reduced by the availability of mobile telephony.

Country	GINI	Year	Human Development rank	Urban %	Adult Literacy %	GNI per capita (PPP) per month
Rwanda	28.9	1984	158	18	64	103
Burundi	33.3	1998	171	10	59	55
Yemen	33.4	1998	148	26	49	68
Côte d'Ivoire	36.7	1995	161	45	48	123
Mauritania	37.3	1995	154	62	51	171
Uganda	37.4	1996	147	12	69	121
Tanzania	38.2	1993	160	35	69	56
Mozambique	39.6	1996	170	36	46	98
Guinea	40.3	1994	157	35	-	180
Senegal	41.3	1995	156	50	39	138
Kenya	44.5	1997	146	39	74	94
Madagascar	46.0	1999	149	27	71	70
Guinea-Bissau	47.0	1993	166	34	-	58
Cameroon	47.7	1996	142	51	68	177
Gambia	47.8	1998	151	26	-	158
Burkina Faso	48.2	1998	173	18	13	98
Ethiopia	48.6	2000	169	16	42	63
Malawi	50.3	1997	162	16	64	53
Mali	50.5	1994	172	32	19	79
Niger	50.5	1995	174	22	14	65
Nigeria	50.6	1996	152	47	67	81
Zambia	52.6	1998	163	36	68	74
Zimbabwe	56.8	1995	145	35	90	170
Central African Republic	61.3	1993	168	43	49	92
Sierra Leone	62.9	1989	175	39	30	46

Source: UNDP (2003); World Bank (2004b).

In many instances governments have been tempted or persuaded to manage the introduction of competition, usually in order to protect the commercial interests of the incumbent operator and, sometimes, other operators. In only a few cases has more complete competition been allowed or created and for the remainder, it could take many years.

In DR Congo, despite internal strife and civil war, there has been the entry of foreign operators making significant investments, notably Celtel and Vodacom. With the number of operators rising to three and eventually to six, the result has been rapid growth to an estimated 3.5 million customers by the end of the first quarter of 2006 (see Figure 3). There has already been discussion of the licensing of 3G, in order to increase the spectrum available to operators. The contrasting case is Ethiopia, where the absence of competition had seen very limited growth of the GSM customer base, with a total of less than 0.7 million customers at the end of the first quarter of 2006, not quite 1% teledensity.

A very small number of market players, protected by high politico-regulatory barriers to market entry, can easily result in price shadowing and even in collusion. Analyses of the markets for mobile call origination in France, Ireland and Spain have illustrated this problem, despite operators competing on the market for some years. In the case of France there has been shown to be collusion between the three operators, resulting in heavy fines (Conseil de la Concurrence 2005). To date, there has not been detailed analysis of markets in Africa, nor the regulatory action to remedy the lack of effective competition.

One measure of market concentration is the Herfindahl-Hirschman Index (HHI), showing the extent to which a small number of firms account for a large proportion of output. It is used as one possible indicator of market power or competition amongst firms, by summing the squares of the market shares of all firms in the industry. The higher the HHI for a specific market, the more it is concentrated. An HHI below 1000 means that the market concentration can be considered to be low, between 1,000 and 1,800 moderate and above 1800 as highly concentrated. For example, in Morocco with only two operators the HHI has declined from 5,900 in 2003 to 5,500 at the end of 2006, while in South Africa with three operators it was 4,600. By comparison, the figure in France was 3,750 while Hong Kong SAR managed 2,200.

The ITU reports the following countries as retaining a monopoly on international services: Botswana, Burkina Faso, Cape Verde, Eritrea, Ethiopia, Gambia, Lesotho, Namibia, Tanzania and Zimbabwe. Others do not permit GSM operators their own gateway, or require additional licences and payment of fees. Lifting these restrictions would have the effect of significantly reducing the prices of outbound international calls and also the cost of inbound calls. The present limits on international telecommunications operations no longer serve any valid economic purpose, but constrain the rest of the economy.

The GSM operators have struggled to exclude alternative technologies and business models, not least by proclaiming the success of their own model. They appear to be concerned

with avoiding introduction of any different version of 3G and also of technologies such as CDMA in the 450 MHz band and WIMAX in the 2.5 and 3.5 GHz bands. This presents a serious public policy problem by excluding cheaper alternatives and by reducing the opportunities to develop innovative business models for broadband.

While most countries now have more than one operator and thus nominal competition, the true extent of competition has seldom been measured in terms of falling prices, rising quality and increased geographic coverage. HHI scores show highly or very highly concentrated markets, largely because of the reluctance of governments to issue more licences in the face of resistance from established operators. This lack of competition goes some way towards explaining the high prices and thus profitability of the GSM operators. Competition between technologies will become much more important in driving the movement to new business models.

4. Economic benefits

The lack of infrastructure in developing countries is self-evident, not least in Africa, with serious consequences for economic growth. The problem has been to raise funds and to find ways in which the private sector can raise funds needed to pay for closing the infrastructure deficit. For example, the Asian development banks identified a need for USD 1,000 billion in infrastructure for the period 2005-2010 (ADB et al. 2005).

The African Development Bank (AfDB) has drawn attention to the poor performance of the continent in terms of access to water, to electricity and to telecommunications, both in quantity and in quality. The magnitude of the infrastructure deficit and the financing challenges were considered to require concerted efforts from all funding agencies (AfDB 2006a). Infrastructure development has been put at the heart of the New Partnership for Africa's Development (NEPAD) strategy for poverty reduction through growth and full participation in the global economy – via the Infrastructure Development Programme.

Since many countries lack the economies of scale found in larger markets, infrastructure development can serve as a driver for regional integration and trade competitiveness. It can also be a necessary basis for development of infrastructure in order to allow for economies of scale through pooling of resources and joint facilities, as well as to overcome the limitations of small and fragmented markets. One such regional project has been the East Africa Submarine Cable System (EASSy) which is to improve international and regional communications.³

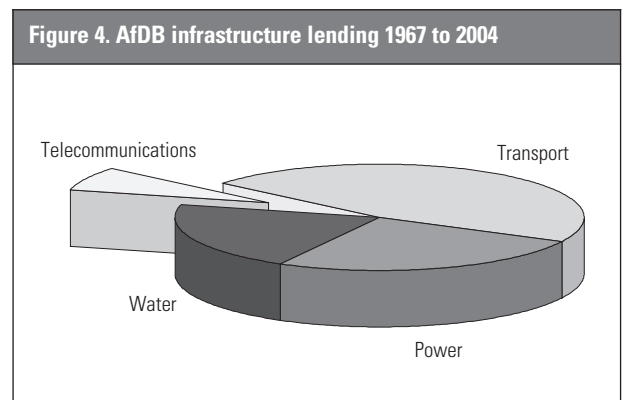
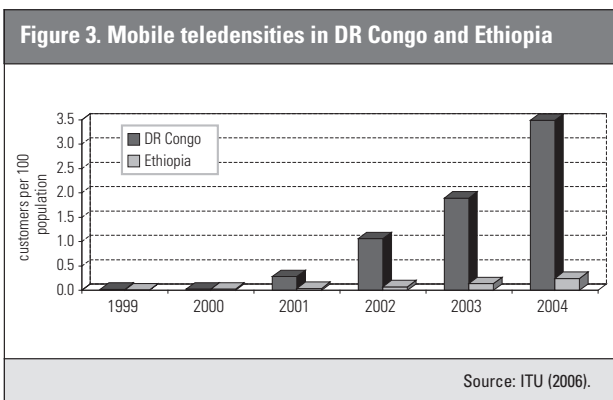
The AfDB lent 36% of its funds on infrastructure projects in the period 1967 to 2004 (AfDB 2006b). However, only 3% of the USD 12.5 billion of infrastructure funding went to telecom projects (see Figure 4).

In 2005 the World Bank lent 1% of both its USD 3.9 billion for Sub-Saharan Africa and USD 1.3 billion for MENA for “information and communications” (see Table 3). Although small in size, the investments in Celtel, Investcom and MTN have proved highly profitable.

The Vodafone Group funded research on the effects of mobile telephony in Africa in an effort to demonstrate the economic benefits of the adoption of GSM technologies (Vodafone 2005). This followed a research tradition in which investment in fixed telecom has been shown to be strongly linked to economic growth. Unsurprisingly, Waverman et al. (2005) confirmed this for mobile telephony. This work continues at the London Business School in a programme funded by the Leverhulme Trust.⁴

In Africa, the research shows the effects where cellular wireless network costs are significantly lower and more easily scaleable than with traditional fixed networks. Moreover, pre-paid cards have made mobile telephony more accessible than subscription-based fixed telephony, always provided it continues to be supported by high MTRs.

However, there has been no research, even for developed countries, that separates out the economic value of mobility in telecommunications. In developed countries the incremental



effect of mobile phones, on top of widespread access to fixed telephony, is very hard to quantify. Much of it will be conspicuous consumption, not contributing to economic growth. Research is needed on the relative economic merits of full and partial mobility, especially when compared to nomadic and fixed telecom. Equally, as the emphasis in telecom moves towards fixed and mobile broadband access, there is a need to assess the economic value of the uses of these technologies.

The infrastructure deficit remains very evident in Africa. Even with the considerable progress that has been made with cellular wireless telephony, it has been against advances in other parts of the world, leaving Africa with a continuing, if evolving, deficit. In turn, that infrastructure deficit gives rise to significant economic disadvantages. The progress achieved has been made by the private sector, which obliges governments to put more emphasis on the macro-economic and politico-regulatory environments that will enable further investment and sustainable operations.

5. Vodafone Group plc

The largest global mobile operator in financial terms is the Vodafone Group plc – although China Mobile is larger in customer numbers it has significantly smaller revenues. Faced with slowing growth in mature markets, the need to cut costs and to boost growth in emerging markets, Vodafone restructured its business into three divisions: Europe, emerging markets and new business (Vodafone 2006). Vodafone had been under increasing pressure to match competitors in steps toward integrating fixed and mobile service offerings. Arun Sarin, its CEO, said:

By creating three new business units ... we are reflecting the different approaches that will be required to succeed, both in terms of our existing operations and in capturing new revenue streams for the future.

Table 3. World Bank activity in Africa in 2005

Country	Company	Loans (USD million)	Equity (USD million)	Institution
Cameroon	Orange	9.4	13.8	IFC
DR Congo	Celtel	16.3	-	IFC
Ghana	Investcom	40.0	-	IFC
Morocco	Medi Telecom	76.6	-	IFC
Nigeria	MTN	35.0	-	IFC
Sierra Leone	Celtel	1.2	-	IFC
Zambia	Celtel	2.3	1.3	IFC
Sub-Saharan Africa	Celtel	10.0	11.8	IFC

Source: IFC (n.d.); and IFC and Investcom Holding (2005).

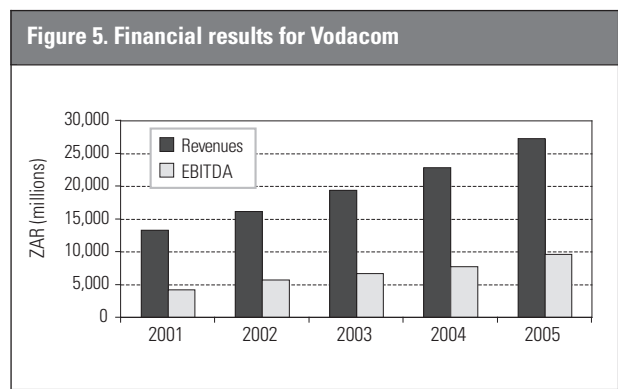
In emerging markets, Vodafone is present in several African countries, both directly and through Vodacom, a 50/50 joint venture with Telkom South Africa. South of the equator Vodacom is the brand used, elsewhere it is Vodafone. The financial results for Vodacom have shown impressive growth (see Figure 5).

The cumulative capital expenditure by Vodacom, up to and including 2005, had been almost ZAR 25 billion.⁵ Of this over 80% had been spent in South Africa, with the remainder being ZAR 1,359 million in Tanzania, ZAR 1,759 million in DR Congo, ZAR 696 million in Mozambique and ZAR 210 million in Lesotho.

In 2005, Vodacom had a total of 15.5 million customers spread across its operations in Africa, some of which are a decade old: South Africa (1994), Lesotho (1996), Tanzania (1999), DR Congo (2001), Mozambique (2003).

Vodacom had over twelve million customers in South Africa, with a market share of just over one half. These split between about eleven million prepaid customers with an ARPU of ZAR 78 and almost two million post-paid customers with an ARPU of ZAR 624. Saturation of the market would seem to be very close, so that customers will have to be persuaded to use new services if revenue growth is to be maintained, requiring substantial investment in new networks.

Vodacom launched a 3G service in South Africa at the end of 2004 using universal mobile telephone system (UMTS), later upgraded to 3.5G with high speed download protocol access (HSDPA) in early 2006. It announced its intention to launch the same services in Dar es Salaam, though it is unclear if or when it will extend that service to other parts of Tanzania. Presumably this is intended to be paid for from international roaming revenues from visitors from South Africa and elsewhere, rather than a large local market. For the present, there is very limited evidence of use of 3G and only a small contribution to Vodacom revenues. Nor are there signs of the emergence of local suppliers of mobile value-added services (VAS). Separately, Vodacom has also experimented with a DVB-H mobile television service.



Vodacom has generated significant growth outside South Africa (see Figure 6). The performance in DR Congo is especially impressive, given the continuing political problems and the level of competition. Associated with this are quite high operating costs, for example, in providing security for employees. There are also problems of securing base stations, in particular the generators and fuel supplies. It is not yet clear how profitable these operations will prove to be.

There has been an inevitable decline in the ARPU, as more but poorer customers are added. However, there is less variation between the countries than might have been expected (see Figure 7). Taking GNI per capita per month as a proxy for income, the ARPU are respectively 2.5% in South Africa, 4.6% in Lesotho, 7.2% in Mozambique, 19.5% in Tanzania and 23.3% in DR Congo.

Vodafone owns nearly 40% of Safaricom, one of two GSM operators in Kenya, the other being KenCell.⁶ The remaining 60% of Safaricom is held by the fixed incumbent operator Telekom Kenya which has been due for privatisation for some years. In January 2006 the Government of Kenya, in its National ICT Strategy, proposed to sell 24% to a strategic investor and to float 34% on the Nairobi Stock Exchange (Ministry of Information and Communications 2006). Safaricom obtained an international gateway licence in early 2006.

Vodafone Group presently owns 50.1% of Vodafone Egypt.⁷ Previously, it held 67%, with 10% owned by Alkan Group, 5% owned by Banque du Caire and the remainder by a number of companies and individuals in Egypt, including Orascom. Vodafone sold 16.9% to Telecom Egypt, the state-owned incumbent operator in 2005. Telecom Egypt subsequently bid for the third GSM licence in partnership with Telecom Italia. If that succeeds it will, presumably, sell its shares in Vodafone Egypt back to the Vodafone Group, otherwise it will continue to profit from the investment in Vodafone. This appears to be a highly unusual every-way bet on mobile telecoms with Telecom Egypt being supported by the government.

Vodafone Egypt showed significant growth in 2005, with an increase of 71% to almost six million customers and revenues

rising by one third to EGP 1.4 billion.⁸ Capital expenditure for the year was about EGP 1.6 billion.

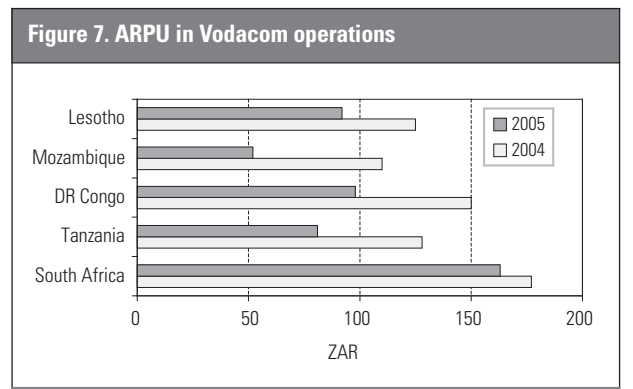
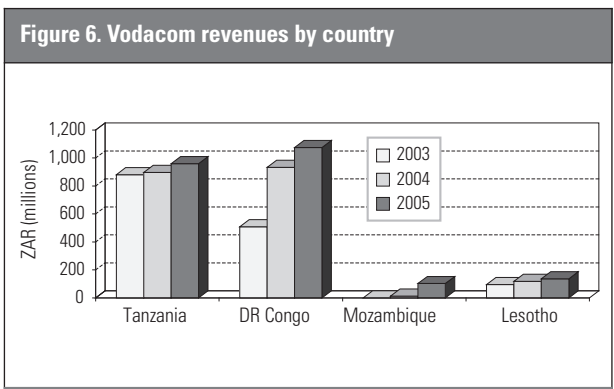
For Vodafone and Vodacom there remains potential for expansion via acquisitions and new licences. However, the Vodafone Group faces considerable competition from other large groups that have driven prices up to levels that it would not be able to justify to its shareholders. The withdrawals from Sweden and Japan and potentially from the US and Fiji suggest that the future geographic configuration of Vodafone is far from clear, thus an exit from Africa is not unimaginable. Tension between Vodacom and Vodafone raises the question of why Vodafone is in Africa at all, given that the growth it is achieving is not making significant contributions to its overall profits, which depend more on the success of 3G in Europe.

6. Investcom

Investcom LLC was a private company led by Najib Mikati, former prime minister of Lebanon. It operated under the Areeba brand in several African markets (Benin, Ghana, Guinea-Bissau, Liberia and Sudan) and also in Cyprus, Syria and Yemen. In 2005 it was awarded further licences in Guinea and in Afghanistan. In May 2006 Investcom was acquired by MTN of South Africa (Investcom 2006).

Investcom began operations in Lebanon in 1982 through the creation of Inteltec, a telecommunications engineering services company. In 1991 it established the first privately owned and operated GSM network in the MENA region, from which it built by acquisition and licensing across MENA.

The Investcom footprint at the end of 2005 covered ten countries and a population of 147 million. Mostly these had teledensities of only a few percent, reflected in the total of just under five million customers for Investcom and high growth potential. At the end of 2005, almost 88% of its customers were prepaid, because of the primarily cash economies in which it operated, the low levels of disposable income of the individuals and their inexperience in managing credit. The subscription customers were mostly in Syria (see Figure 8).



In July 2005, Areeba became the second operator in Sudan. Despite the considerable problems of civil war, it managed to acquire over one quarter of a million customers in the first five months of its operations there. These appear to be mainly in Khartoum, a city of around six million.

Given the types of economies in which Investcom operated, a substantial difference between the post-paid and prepaid ARPU would be expected (see Figure 9). Both would decline over time as the customer base was widened to include more but poorer customers. Additional IP-based services might sustain post-paid ARPU, but there is little evidence of this to date.

The rapid expansion of the customer base combined with increased usage resulted in gross operating revenues growing by 43% in 2005, from USD 633 to USD 903 million (see Figure 10). The core markets for Investcom were in Syria and Ghana.

In October 2005 Investcom floated almost one quarter of its shares on the London Stock Exchange and the Dubai International Financial Exchange, valuing the firm at USD 3.3 billion. In early May 2006, MTN purchased Investcom for USD 5.5 billion with a mixture of cash and shares, representing a very substantial increase in value since the previous October. Indeed, this valuation at almost USD 1,000 per customer appears to be a serious over-estimation of its net worth. It hints at a return to the irrational exuberance of the dot-com bubble and the pat-

tern of excessive payments in acquisitions of mobile operators seen in Europe in the late 1990s.

It could be that MTN values the large number of potential future customers, or in other words, that it is betting on growth. This was the same basis as the wave of European acquisitions in the 1990s that pushed financial analysts to strict reliance on ARPU and away from promises of future revenues based on population covered. MTN was able to pay for the purchase in part with shares, but also by selling bonds on the Johannesburg Stock Exchange, valued at ZAR 7 billion (USD 3.85 billion), indicating that the financial markets remain confident about its prospects.

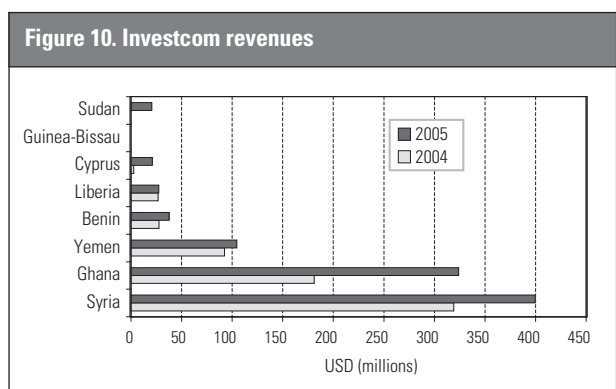
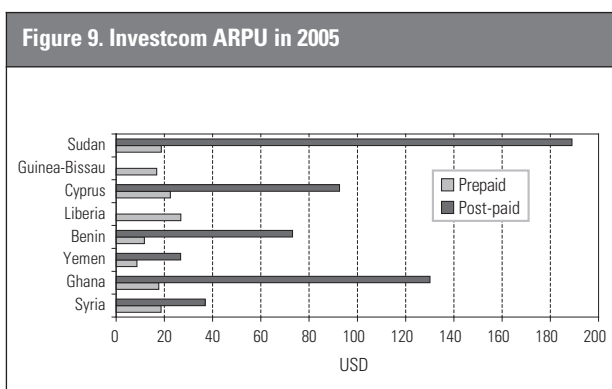
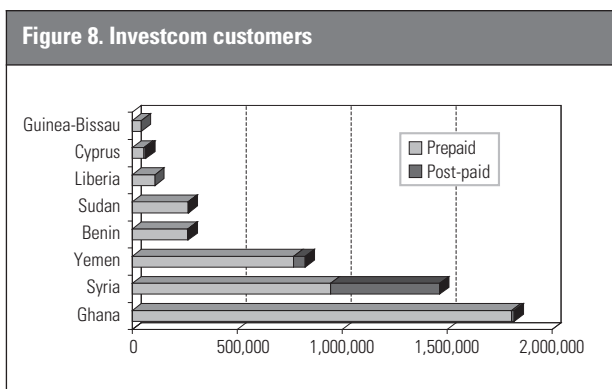
An accurate valuation of Investcom is not easily achieved. Clearly, the financial markets put a high value on the company, implying confidence that it will achieve strong growth in customer revenues. Given risks of further market entry and technological change, the financial markets may be being overly optimistic. For the present, organic growth will continue to deliver new customers, but mostly with a very modest ARPU.

7. MTN

MTN is registered in South Africa and listed on the Johannesburg Stock Exchange. It has substantial operations there and in Nigeria, respectively 10.2 and 8.4 million customers at the end of 2005, with a further 4.6 million customers in other African countries.⁹ Nigeria has proved problematic for MTN where it has fought and, at the time of writing, lost legal battles with Celtel for control of Vmobile, a mobile operator.

Financially, MTN has grown significantly (see Figure 11). However, revenues have not kept pace with customer numbers, given the lower incomes of new customers and some having several SIM cards.

The ARPU has, as would be expected, declined as the customer base has widened in each country (see Figure 12). It has converged towards USD 20 or ZAR 120, with South Africa being a little higher because of the much larger proportion of subscription customers.



In addition to organic growth in its established markets, MTN acquired Investcom, giving it a substantial footprint across Africa: Cameroon, Congo (Brazzaville), Côte d'Ivoire, Ghana, Guinea-Bissau, Nigeria, Mauritius, Rwanda, South Africa, Sudan, Swaziland, Togo and Uganda. Additionally, MTN acquired a 49% stake in Irancell, for USD 350 million, a potentially lucrative market but where the politics are very delicate and security a major concern.

In South Africa, MTN launched a 3G (UMTS) service in mid-2005 and like Vodacom it is also migrating to offer HSDPA. However, this is aimed only at a niche market for post-paid subscribers and not yet the mass market. In some respects it is a substitute for fixed broadband, given the very high prices in South Africa.

Prior to the acquisition of Investcom, over 80% of the shares were held by nominees. Part of the acquisition having been paid in shares, the Mikati family now has a 10% stake in MTN.

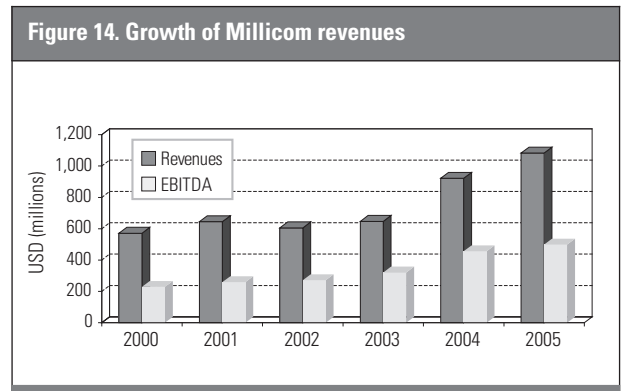
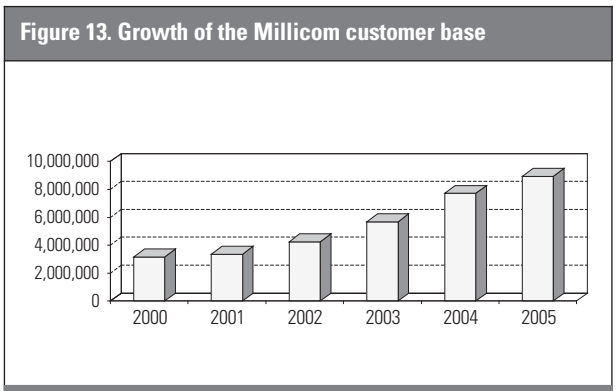
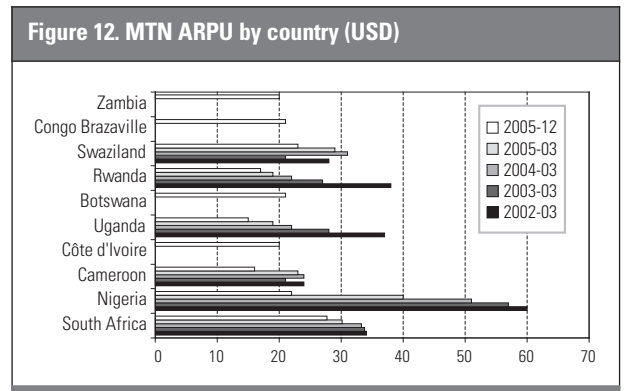
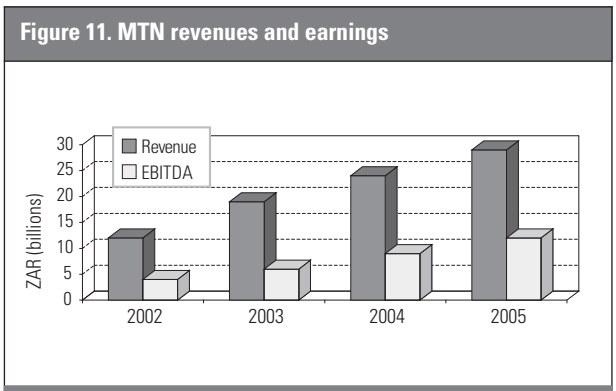
An assessment of MTN depends on the one hand on the valuation of its acquisition of Investcom and on the other on its ability to evolve to new business models. On both counts there are serious doubts, but nothing more. MTN appears to be funding expansion from its two cash cows in Nigeria and South Africa, which cannot be sustained indefinitely.

8. Millicom

Founded in 1968 in Luxembourg, Millicom maintained a comparatively low profile, while building up its portfolio of mobile network operations in developing countries (see Table 4). It entered markets early, in partnership with local interests, which it has often later bought out. Millicom was ranked by *Business Week* as number 93 in its InfoTech 100 in 2006, reflecting its strong growth, much of it under the Tigo brand for pre-paid mobile telephony.¹⁰

Millicom has shown strong growth in recent years, having reached ten million customers, primarily prepaid, in early 2006 (see Figure 13). Its operations are all in countries with low or very low teledensities, where GSM operators have been able to take advantage of unmet demand. Many of its African operations are in countries that have conflicts or have recently emerged as post-conflict, with a few having intermediate or semi-conflict status.

The growth in number of customers is reflected in the growing revenues and earnings before interest, depreciation, taxes and amortisation or EBIDTA (see Figure 14). Capital expenditure in 2005 was USD 88 million per quarter and USD 95 million in the first quarter of 2006. Of the revenues in 2005, USD 204 million were from Africa, about 20% of the total, hav-



ing grown 36% since 2004, while the EBIDTA in Africa was USD 88 million.

Millicom is listed on NASDAQ, with the Swedish investment firm Kinnevik AB owning around 35% of the shares. Kinnevik also owns 30% of Tele2, a somewhat disruptive presence on several European fixed and mobile markets.

In January 2006 Millicom, with Morgan Stanley, announced a strategic review, after having received a number of unsolicited approaches from other firms. The public bids included Investcom offering USD 5 billion, but with China Mobile winning by paying USD 5.3 billion. This values each Millicom customer at around USD 530, or fifty times ARPU.

The collapse of bids for Millicom caused its shares to tumble. Perhaps, in time, another bidder will appear. However, the underlying business remains solid, with good prospects for continued growth across its very wide portfolio.

9. Celtel

In January 2004, what had been MSI Cellular Investments Holdings, based in Hoofdorf in the Netherlands, was renamed Celtel International BV. MSI Cellular Investments was founded in 1998 by Mohamed Ibrahim, who had previously founded and run Metapath Software Inc. (MSI), and before that was a technical director at Cellnet in the UK.

Celtel built up a vast geographic footprint across Africa, but with significant gaps in the populous states of Egypt and South Africa (see Figure 15). Its presence in Nigeria, a very large and rapidly expanding market, has been subject to complex and protracted litigation with MTN of South Africa over the ownership of Vmobile. For now, this seems to have been settled in favour of Celtel, which hold 65% of the shares. Further expansion has continued, for example, in 2005 when Celtel acquired Madacom, a GSM operator in Madagascar with some 200,000 customers.¹¹ In Zambia, Celtel also operates an m-commerce service, known as Celpay.

In early 2006 Celtel acquired sole ownership of Mobitel, a GSM operator in Sudan, covering some of the areas controlled by the Khartoum government, notably the capital, but neither Darfur nor the south. Celtel, which already owned 39%, purchased the remaining 61% of Mobitel stock from the incumbent state-owned operator, Sudatel. However, the price of USD 1.3 billion put the value of Mobitel at USD 2.1 billion or USD 100 per customer – a remarkably high value.

There may be some premium justified by buying out the government, a form of one-off licence fee. Investment in Sudan would appear to have a high political risk, though this is reduced while Mobitel remains in areas controlled by the present government, especially around the capital. Because the chairman, Mohamed Ibrahim, is of Sudanese origin, the commitment to the country is very strong.

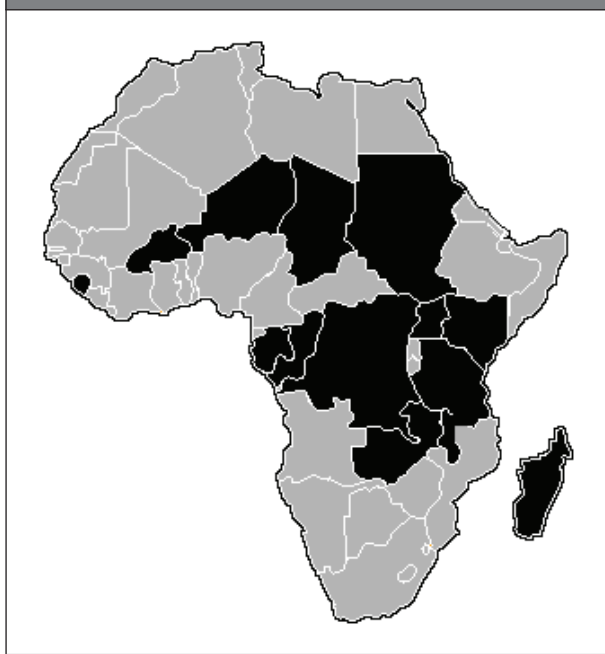
In March 2005, MTC agreed to acquire Celtel for USD 3.4 billion, beating MTN, and making what it claimed was the largest single FDI ever made in Africa.¹² MTC was then a provider of mobile telecommunications in six Middle Eastern countries, to which Celtel added 13 Sub-Saharan African countries. MTC is listed on the Kuwait Stock Exchange and had a total of 7,000 employees and over 14 million customers.

With only five million customers, the acquisition valued the customers at USD 670 each, a comparatively high value when the ARPU is USD 21 per annum and declining. However, revenues show strong growth, as has the EBIDTA (see Figure 16).

In 1983, MTC was the first mobile operator in Kuwait and in the Middle East. Initially, this was ETACS cellular service,

Africa	Asia	Latin America
Chad	Cambodia	Bolivia
DR Congo	Iran	El Salvador
Ghana	Laos	Guatemala
Liberia	Pakistan	Honduras
Mauritius	Sri Lanka	Paraguay
Senegal	Viet Nam	
Sierra Leone		
Tanzania		

Figure 15. Map of Celtel licences



replaced in 1994 with a GSM service and more recently supplemented by a UMTS (3G) service. MTC expanded abroad in 2003 by acquiring a controlling interest in Fastlink, a GSM operator in Jordan, and GSM licences in Bahrain and Iraq. In 2004, it reached a management agreement with MTC Touch in Lebanon. In its home market, the government of Kuwait introduced competition in 2000 and reduced its holding in MTC from 49% to 25% in 2001.

Celtel's acquisition of MTC was a very substantial expansion into quite different areas, which are linguistically and culturally more diverse and significantly poorer. Backed by MTC, Celtel is a now a financially powerful presence in Africa with a substantial footprint. It has the capacity to spread its political risk, to share what it learns from its different operations in order to improve its performance and to develop new business models.

10. Orascom

The Orascom Group is privately controlled, comprising:

- Orascom Construction Industries;
- Orascom Hotels and Development;
- Orascom Technology Solutions; and
- Orascom Telecom Holding SAE.

Orascom Telecom Holding (OTH) owns interests in GSM operators in Algeria, Egypt, Tunisia, Zimbabwe and Pakistan and Bangladesh, with some 30 million GSM customers (see Figure 17). It has gradually increased its holdings, for example, taking it to 50% of Tunisia and 88% of Djezzy (Algeria). At the same time, OTH sold its stakes in Oasis (DR Congo) and Libertis (Congo Brazzaville). It has expressed an interest in acquiring the third licence in Saudi Arabia and will doubtless pursue other opportunities as they arise. Orascom Telecom has also acquired, in partnership with Telecom Egypt, a fixed network operator licence in Algeria.

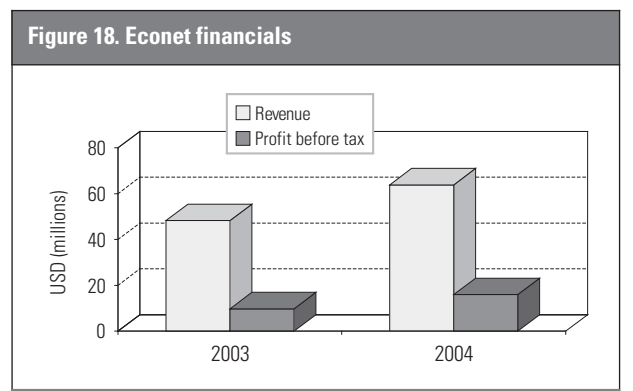
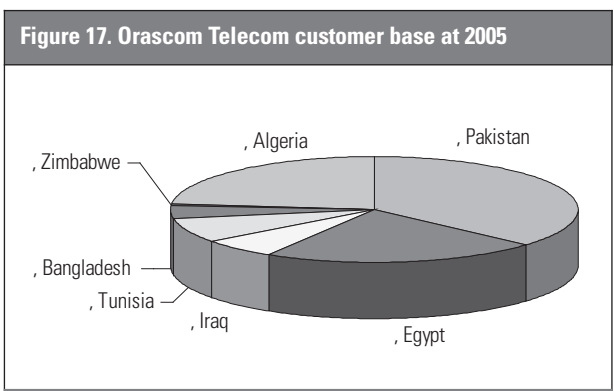
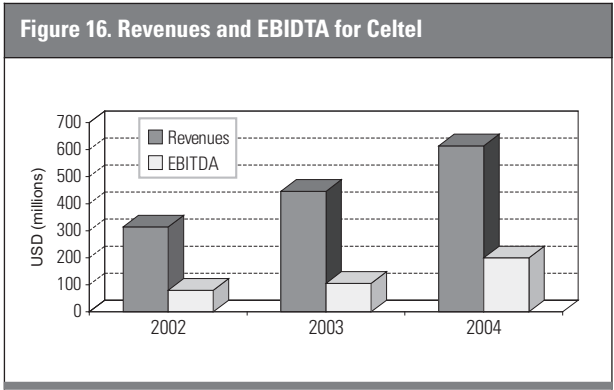
Revenue from its GSM operations were USD 1,799 million in 2004, rising to USD 2,793 million in 2005, generating EBIDTA of USD 979 million and USD 1,332 million respectively. The capital investment over the last two years by OTH subsidiaries has been substantial (see Table 5).

Orascom purchased the Italian operator Wind in 2005, a company with 14 million customers and EUR 4.7 billion in revenue (in 2004) (Wind 2005). This was seen as a surprising move by Italians and was not entirely welcomed, despite the high price it paid.

Predicting the future path of privately controlled groups is notoriously difficult, since they are less obliged to signal their intentions. Clearly, Orascom Telecom will expand in MENA as opportunities present themselves, though probably not in Sub-Saharan Africa. It seems unconstrained by financial resources in expanding. It will also continue to invest in its present portfolio of networks.

11. Econet Wireless

Econet Wireless is smaller than the other groups and has had a more troubled existence, with many legal battles with investors and putative partners.¹³ Operations in Zimbabwe are severely constrained by shortages of foreign currency, essential for the purchase of equipment and also for the settlement of international traffic. The gross revenues of Econet were only USD 60 million in 2004 (see Figure 18).



In 2005, Econet had five million customers in Botswana, Kenya, Lesotho, Morocco, Nigeria, Rwanda, South Africa and Zimbabwe, to which it added a licence for Burundi in early 2006.

Additionally, Econet Wireless Limited has a licence in New Zealand, in combination with Maori interests. This is a technology neutral licence which had originally been expected to be used for GSM, though after long delays it appears that EWL will use it for a 3G network.

The small size and the management troubles of Econet Wireless suggest that its future is uncertain and that it might well become a target for more acquisitive groups, if they can avoid the difficulties encountered by others. It is now too late for Econet to build its operations by acquisition, forcing it to rely on the slower path of organic growth and being assigned further licences. Moreover, there are unavoidable high risks, both political and financial, because of its involvement in Zimbabwe.

12. Conclusions

There has been significant investment in network infrastructure and in expansion of the markets for cellular telephony in Africa, reaching a mobile teledensity of almost 16%. This has largely been by companies based in Africa and the Middle East or those specialising in the region, able to draw on capital from financial markets in developed economies and the Gulf. An obvious exception is Vodafone, a European company with significant strategic investments in Africa.

The political risks of operating in Africa are nominally quite high, but seem not to deter mobile network operators. In practice almost no licences have been revoked and few adverse regulations have been imposed on operators. Since competition is limited, prices can be kept high, boosting profits. Businesses can be sold, often at surprisingly high values, ensuring an easy

exit from a market. Operators are able to spread their risks across many countries.

African mobile telecom is now dominated by a small number of large groups. These corporations seem likely to continue in strong positions, given their capacity to generate capital and to make cost effective purchases on the global market for equipment. They have shown solid organic growth within their existing footprints and by their expansion into other countries, obtaining additional licences and acquiring other operators. The prospects for further expansion are good, since many millions of potential customers remain to be served and many countries could issue a third or fourth licence. However, potential customers are mostly very poor and many live in the countryside, often engaged in subsistence agriculture with little cash income.

Some of the recent deals give cause for concern with the possibilities that irrational exuberance or even a bubble economy might be building under GSM operators in emerging markets. The valuation of Mobitel at USD 2.1 billion and of Investcom at USD 5.5 billion appear to exceed, by a considerable measure, their true worth, even discounting the political and market risks. By comparison, the EASSy project will cost only USD 0.25 billion, but has required enormous efforts to raise the funds.

The continued reliance on EBIDTA as the primary comparative indicator is also a concern, when other sectors prefer more accurate and complete measures. Accurate ARPU data, with clear separation of voice, SMS, data and VAS contributions is essential for understanding developments.

It is unclear what would be the consequences of the controlling groups having to write off much or all of these very high valuations. Minimally, it would seem to make raising further capital much more difficult and thus hinder future network growth. However, at present there is no pressure on the operators to adjust these values.

While there has been considerable investment and generation of significant profits it is much less clear that there is real competition. The very high levels of concentration in markets arise from the limited number of market entrants in most countries, resulting from the staged introduction of additional operators. This has been justified by the alleged need to avoid turmoil in markets and to share out limited spectrum, but also to reduce the required investment in base stations.

A small number of players in any market will tend to copy each other's practices, rather than to drive down prices and to drive up quality. Where governments are concerned with the high level of profits or by the low levels of competition, the logical response would be to increase competition, which would deliver significant downstream economic benefits, although operators will actively resist such measures. It would be possible to issue more licences and more diverse licences (e.g., CDMA450 and WiMAX) to new entrants. Additionally, there is a range of simple pro-competitive regulatory measures including the introduction of mobile number portability, the regulat-

Table 5. Capital expenditure of subsidiaries (USD millions)

Country	Brand	2004	2005
Algeria	Djezzy	408	457
Egypt	MobiNil	110	427
Tunisia	Tunisiana	1,121	106
Africa	Telecel	13	1
Bangladesh	Banglalink	14	113
Iraq	Iraqna	89	125
Pakistan	Mobilink	340	615
	Other	18	25
	Total	1,113	1,871

ed reduction of mobile termination rates and allowing MNOs to operate their own international gateways.

Criticisms voiced by the GSM Association about regulatory regimes appear to be self-serving, seeking advantage for its members and an unjustified lessening of tax and regulatory burdens. Few African countries have engaged in the serious regulation of mobile markets seen in Europe or India. While the GSM Association complains about the taxes on imported equipment, its members seem very reluctant to block the use of illegally imported and stolen handsets. Operators would rather take the call revenues from the use of stolen phones than protect their original owners by blocking handsets listed as stolen in the Central Equipment Identifier Register (CEIR).

The focus of regulation will have to shift from licensing towards a more strongly pro-competitive focus. It will require careful analysis of the levels of competition on the different markets and the steps which can be taken to raise them, in order to deliver goals of lower price and higher quality.

There have been some early moves into mobile payments and m-commerce, complementary services that will generate little network traffic. On the one hand they raise regulatory issues about the application of banking regulations to mobile operators and on the other they might allow the unbanked access to limited financial services. One very obvious risk is the leveraging of market power from cellular telephony into banking.

Today, the business model is very close to monoculture, exclusively prepaid GSM voice and SMS, supported by the high charges for inbound calls. There has been some very limited experimentation in data and value-added services aimed at subscription customers, but nothing that suggests a new prepaid business model for 3G or multi-play. Yet, in a future that is based on value-added services and broadband, this delay in innovation creates the risk of sudden and potentially disruptive change.

Possible business models may well see convergence in handsets offering access to a range of technologies including satellite-based digital broadcasting and terrestrial wireless, though this evolution will not be immediate or direct.

Notes

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² CDMA Development Group
<http://www.cdg.org/worldwide/index.asp?h_area=5>.

³ <<http://www.eassy.org/>>.

⁴ London Business School Digital Transformations
<<http://www.london.edu/digitaltransformations.html>>.

⁵ 1 USD is equivalent to ZAR 6.10.

⁶ <<http://www.safaricom.co.ke/>>

⁷ <<http://www.vodafone.com.eg/>>

⁸ 1 USD is equivalent to EGP 5.80.

⁹ <<http://www.mtn.co.za>>

¹⁰ <<http://yahoo.businessweek.com/it100/2006/93.htm>>

¹¹ <<http://www.madacom.com/>>

¹² <<http://www.msi-cellular.com/en/news/press-release26/index.html>>

¹³ <<http://www.econetwireless.com/>>

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13. MULTINATIONAL OPERATORS IN AFRICAN MOBILE MARKETS

Annex						
Country	Celtel	Econet	Millicom	MTN	Orascom	Vodafone
Algeria					X	
Angola						
Benin						
Botswana				X		
Burkina Faso	X					
Burundi						
Cameroon				X		
Cape Verde						
Central African Rep.						
Chad	X		X			
Comoros						
Congo (Brazzaville)	X			X		
Congo (DRC)	X		X			X
Cote d'Ivoire				X		
Djibouti						
Egypt					X	X
Equatorial Guinea						
Eritrea						
Ethiopia						
Gabon	X					
Gambia						
Ghana			X			
Guinea						
Guinea-Bissau						
Kenya	X					X
Lesotho						X

Country	Celtel	Econet	Millicom	MTN	Orascom	Vodafone
Liberia						
Libya						
Madagascar	X					
Malawi	X					
Mali						
Mauritania						
Mauritius			X			
Morocco						
Mozambique						
Namibia						
Niger	X					
Nigeria				X		
Rwanda				X		
Sao Tome & Principe						
Senegal			X			
Seychelles						
Sierra Leone	X		X			
Somalia						
South Africa				X		X
Sudan	X					
Swaziland				X		
Tanzania	X		X			X
Togo						
Tunisia					X	
Uganda	X			X		
Zambia	X			X		
Zimbabwe						

Privatisation, Regulation and Investment: A case study of the telecom regulatory environment (TRE) and investment in Guyana

Samuel Braithwaite

1. Introduction

During the last two decades the global telecom sector has undergone significant changes. Prior to this period the telecom sector of many countries was characterised by state-owned monopoly providers of telephone and telegraph services. Gradually, countries have moved away from this arrangement to privatisation and regulation of the sector, and in some cases, the sector has become competitive.

Evolution of the global telecom sector has been both a by-product and a driver of globalisation. For developing countries the evolution has been understandably slow. However, with privatisation the telecom infrastructure of developing countries has been transformed, albeit at a cost which is eventually passed on to the consumer. Usually, privatisation is complemented with the establishment of sector specific regulatory agencies. In Guyana's case, there is one regulatory agency for all public utilities.

This pilot study is primarily concerned with Guyana's telecom¹ regulatory environment (TRE), and employs a methodology devised by LIRNEasia (see Samarajiva and Dokeniya 2005). The approach of this methodology is to survey knowledgeable respondents, on their perceptions on the TRE of a particular country. To this end, respondents assessed Guyana's TRE based on the six dimensions of the regulatory environment, as outlined in the World Trade Organisation (WTO) Reference Paper of the Basic Telecommunications Agreement. It is hoped that having been able to draw upon the perceptions of knowledgeable persons will have increased the objectivity and veracity of the findings. While the assessment of the TRE can be seen as an end in itself, the impact of the TRE on the level of investment in the telecoms sector was also considered.

The study first examines Guyana's telecom sector, paying particular attention to the privatisation of the state-owned telecom company. It is important to note the privatised telecom company is a powerful force within the local telecom sector, and as such, cannot be treated as just another public utility monopoly subject to government regulation. Next, the study considers Guyana's TRE. The terrain within which the major stakeholders function is detailed and the different elements of the regulatory environment are described and assessed. Finally, concluding remarks and recommendations for further such assessments are made.

2. Guyana's Telecommunications Sector

2.1 Introduction

Guyana lies at the northernmost tip of South America and is bordered by Venezuela to the west, Suriname to the east and Brazil to the south. The country is about 214,970 square kilometres – approximately the size of the United Kingdom – and has a population of about 800,000. Most of the country's inhabitants live along its low coastal plain, a long stretch of land bordered to the north by the Atlantic Ocean, where most of the administrative, commercial, agricultural and manufacturing activities take place. Not surprisingly, most of the country's telecom infrastructure can be found along the low coastal plain.

The story of Guyana's telecom sector is common to other developing countries. Prior to 1991, the state-owned Guyana Telephone & Telegraph Company (GTC) was the sole provider of telecom services. At that time, 21,000 telephone lines were available with a waiting list of about 40,000. The telephone system was archaic, consumers had to make bookings for overseas calls hours before they could make the call, and even local

calls were sometimes difficult to make. It is against this backdrop that GTC was privatised and the landscape of Guyana's telecom terrain changed.

In January 1991, Atlantic Tele-Network Inc. (ATN), a company operating out of St. Thomas, US Virgin Islands, obtained a

Box 1. Highlights of ATN's acquisition of GT&T

- GTC was valued at USD 20 million and as such ATN paid USD 16.5 million for an 80% share of the company;
- The new company (GT&T) absorbed USD 15.8 million in GTC debt, of which USD 11.5 million was owed to Northern Telecom;
- ATN agreed to raise necessary financing for its expansion program and to guarantee all debts, old and new, of GT&T;
- Additionally, ATN agreed to prepare and implement, through GT&T, an expansion and service improvement plan (see excerpt from GT&T's Purchase Agreement below).

Annexure E Section 7; Expansion and Service Improvement Programme (years 1, 2 & 3)

ATN further commits that GT&T shall achieve the following with respect to:

Connections of lines: Within 36 months of its acquisition GT&T shall add at least 20,000 subscribers to the existing subscriber base, estimated at present to be 21,400 as follows: approximately 5,000 subscribers added in the first twelve month period, 7,000 in the second and 8,000 in the third.

- The government and ATN agreed that GT&T would be entitled to a minimum of 15% rate of return on its investment along with 6% advisory fees for the parent company ATN.
- It was agreed that there would be no increases in rates for three years, except in the event of one or a combination of the following events occurring:
 1. A substantial devaluation in the Guyana Dollar
 2. A rise in the long distance charges payable to foreign correspondence
 3. The cost of provision of service to internal locations being substantially higher than stated in the expansion plan
 4. Natural disaster leading to extensive destruction of plant and equipment.

Sources: GT&T's Blue Book and GT&T's Purchase Agreement.

controlling interest in GTC by purchasing 80% of the company's shares; the Government of Guyana (GoG) retained 20%. The Guyana Telephone and Telegraph Company (GT&T) was incorporated on 28 January 1991 and was given monopoly rights for 20 years with the option of renewal for another 20 years.

The move by ATN to acquire a controlling interest in GT&T was certainly a risky move for a number of reasons. First, GT&T inherited a poor telecom infrastructure – amongst the worst in the hemisphere. This implied that considerable time and financial resources would be required to improve the telecom system. Second, Guyana at the time was still labelled as a risky place to do business. In fact GTC was put up for sale long before ATN bought it, but no other investor had submitted a proper offer. Finally, Guyana was going through a period of structural adjustment and stabilisation, and general elections were just around the corner. Certainly, these conditions would have added to the uncertainty of operating in such a volatile environment. Embarking upon the Herculean task of reviving a public utility, in light of the foregoing, was thus a very dicey move. As of January 2006, GT&T's total investment was approximately USD 225 million.

GT&T's licence entitles it to monopoly provision of voice and data services. However, the government has opened up the mobile cellular sector. Apart from providing mainline telephone services, GT&T's main licence also allows it to operate a mobile cellular service. To-date three other companies have secured cellular licences, however, only one (Cel*Star Guyana Inc.) offers a semblance of competition to the incumbent GT&T.

Cel*Star Guyana Inc. was licensed to provide a GSM 900 MHz service on 21 February 2001 – its parent company is Trans World Telecom, Caribbean (TWTC). Cel*Star's initial investment was in the region of USD 20 million with plans for further investment of USD 18 million. Although Cel*Star was granted a licence to operate in 2001, the company only started providing services in 2004. The launch of services was delayed primarily as a result of a court case regarding the company's ownership. At the time of writing, Cel*Star has about 30,000 mobile cellular subscribers.

Caribbean Telecommunications Ltd. was licensed on 23 April 1996 for cellular sub-band A and operates a CDMA service out of Corriverton Berbice. The company initially had about 200 subscribers. At the time of writing, however, the true number of subscribers could not be ascertained.² Caribbean Wireless Telecom, LLC was licensed on 19 April 2000 for PCS band C; however, this company has not yet started operations.

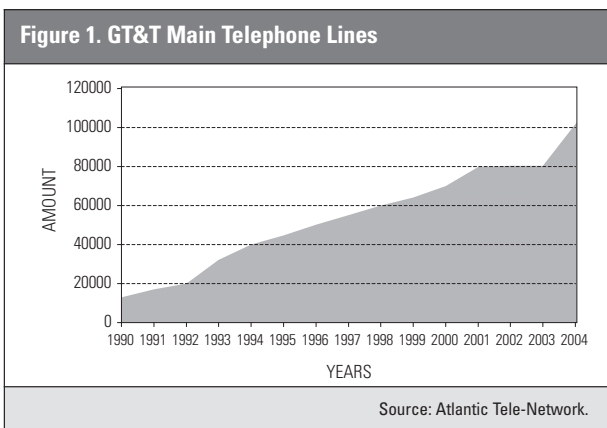
2.2 Telecom investment

Over the years, GT&T has significantly improved Guyana's telecom system (see Table 1). However, there have been numerous examples of public disquiet primarily over the supply of landlines to potential subscribers. In 1996, the Telecommunications Development Bureau of the International Telecommunications Union (ITU) reported that Guyana achieved the highest annual average growth in teledensity in the Caribbean and Latin American region for the period 1990-1996 (cited in GT&T 1998: 5). Table 1 and Figure 1 also highlight GT&T's achievements over the years.

Figure 2 shows the increase in GT&T's investments³ for the period 1990-1999, the steep increase during the early years of the company's existence indicates the relatively rapid investment that GT&T undertook during those early years. Table 2 shows the rapid development in the telecom sector following privatisation. It is useful to observe that prior to privatisation Guyana recorded a negative growth rate, the lowest for the countries selected, and after privatisation recorded the second highest growth rate. Despite these achievements, GT&T has not lived up to its promises and as such there are still long waiting lists for landline services, although recent growth in mobile cellular services has brought some relief to consumers.

Performance Indicator	1991	2004
Fixed operating lines	13	98,39
Mobile operating lines	0	143,945
Total lines (Fixed & Mobile)	13	242,335
Persons with access to telephones	52	600
Public call boxes	0	600
International circuits	99	1,338
IDDD	400	89,9
Call completion rate (%)	20%	65%

Source: GT&T (2004).



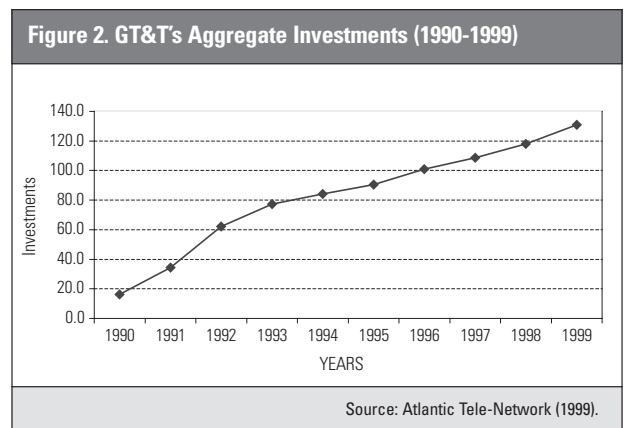
2.3 Main phone lines and cellular subscriptions

This section examines the provision of landline and mobile cellular services for a selected number of countries in the Caribbean, with special emphasis on Guyana. Of the 14 countries selected, Guyana stands at number six for the number of main telephone lines, but, with a very low penetration rate (lines per 100 persons) as compared to the other countries selected. Apart from 2004, Guyana's penetration rate was higher only than Haiti's (see Table 3).

While the mainline sector grew slowly, the mobile sector grew rapidly as illustrated in Table 3. Melody (2005) posited that, "in developing countries, the innovations of poor people in both urban and rural areas in adapting prepaid mobile service to meet their needs have fostered unanticipated dramatic growth in mobile to the point where mobile penetration exceeds fixed line penetration in many countries, and has a broader geographic coverage." Naturally, the bulk of new investment would

Country	Year of Privatisation	% Annual growth prior to privatisation	% Annual Growth After Privatisation
Argentina	1990	5.2	8.2
Barbados	1989	6.7	6.4
Belize	1988	12.1	9.5
Bolivia	1995	2.4	29
Chile	1987	5.7	13.7
Guyana	1991	-2.4	24.1
Jamaica	1989	5.0	16.6
Mexico	1991	5.1	5.6
Peru	1994	4.2	23.7
Trinidad & Tobago	1990	15	5
Venezuela	1991	3.8	6.8

Source: Gutierrez and Berg (2000).



	2001		2002		2003		2004	
	Main telephone lines ('000)	Lines per 100 persons	Main telephone lines ('000)	Lines per 100 persons	Main telephone lines ('000)	Lines per 100 persons	Main telephone lines ('000)	Lines per 100 persons
Antigua	37.3	48.1	38.0	48.8	38.0*	48.78*	38.0	49.4
Bahamas	123.3	40.2	126.6	40.6	131.7	41.5	139.9	44.1
Barbados	129.0	48.1	133.0	49.4	134.0	49.7	135.7	50.1
Belize	35.2	13.7	31.3	11.4	33.3	11.3	33.7	12.9
Dominica	23.3	29.9	23.7	30.4	23.7*	30.39*	21.0	29.5
Grenada	32.8	32.8	33.5	31.7	32.6	29.0	32.7	31.8
Guyana	79.9	9.2	80.4	9.2	80.4*	9.2*	102.7	13.4
Haiti	80.0	1.0	130.0	1.6	140.0	1.7	140.0	1.7
Jamaica	500.0	19.2	444.4	16.9	444.4*	16.9*	500.0	18.7
St. Kitts Nevis	22.5	48.8	23.5	50.0	23.5*	50.0*	25.0	50.0
St. Lucia	50.0	31.7	51.1	32.0	51.1*	32.0*	51.1	32.0
St. Vincent	26.1	22.7	27.3	23.4	32.4	27.3	19.0	15.7
Suriname	77.4	17.6	78.7	16.4	79.8	15.2	81.3	18.5
Trinidad	311.8	24.0	325.1	25.0	325.1*	25.0*	321.3	24.6

Source: International Telecommunication Union.

* Data for 2002.

	2001		2002		2003		2004	
	Cellular subscribers ('000)	Cellular subscribers per 100 persons	As % of telephone subscribers	Cellular subscribers ('000)	Cellular subscribers per 100 persons	As % of telephone subscribers	Cellular subscribers ('000)	Cellular subscribers per 100 persons
Antigua	25.0	32.3	40.2	38.2	49.0	50.1	38.2*	49.0*
Bahamas	60.6	19.7	32.9	121.8	39.0	49.0	116.3	36.7
Barbados	53.1	19.8	29.2	97.2	36.1	42.2	140.0	51.9
Belize	39.2	15.2	52.6	51.7	18.7	62.3	60.4	20.5
Dominica	7.7	9.9	24.9	9.4	12.0	28.3	9.4*	12.0*
Grenada	6.4	6.4	16.4	7.6	7.1	18.4	42.3	37.6
Guyana	75.3	8.7	48.5	87.3	9.9	52.0	87.3*	9.9*
Haiti	91.5	1.1	53.4	140.0	1.7	51.9	320.0	3.8
Jamaica	635.0	24.4	55.9	1400.0	53.3	75.9	1800.0	68.1
St. Kitts Nevis	2.1	4.6	8.5	5.0	10.6	17.5	5.0*	10.6*
St. Lucia	2.7	1.7	5.1	14.3	9.0	21.9	14.3*	9.0*
St. Vincent	7.5	6.5	22.3	10.0	8.5	26.8	62.9	52.9
Suriname	87.0	19.8	52.9	108.4	22.5	57.9	168.5	32.0
Trinidad	256.1	19.7	45.1	361.9	27.8	52.7	520.0	39.9

Source: International Telecommunication Union.

* Data for 2002.

have gone towards the improvement of the mobile cellular service. While Guyana has also joined the bandwagon most of its Caribbean counterparts have had more rapid growth in their mobile cellular markets. Guyana's total mobile cellular subscribers comprise about 50% of the total number of subscribers, while its regional counterparts have higher percentages. Jamaica, for example, increased from 55% to 81.5% (see Table 4).

2.4 Telecom reform

In August 2000, the Inter-American Development Bank (IDB) committed USD 1.5 million in technical assistance for the reform of Guyana's telecom and information sector.⁴ The expectations of the project included:

1. GoG commitment to the WTO Basic Telecommunications Agreement and introduction of a legislative framework within which competition would flourish;
2. Development and implementation of a transparent and non-discriminatory interconnection policy;
3. Competition in all telecommunication services; and
4. Increased number of mobile cellular providers.

To this end the project comprised five components:

1. Modernisation and liberalisation, ending GT&T's 40-year monopoly;
2. Formulation of a policy and strategy for reform of the telecom sector;
3. Establishment of a network cost model and execution of an audit of GT&T;
4. Training and research activities; and
5. Provision of technical assistance for the Public Utilities Commission (PUC).

The GoG had also planned to execute an ICT project to the tune of USD 22.5 million, of which USD 18 million would have been loaned to the government by IDB. However, GT&T blocked the proposed loan in the US courts claiming that the project was in breach of its monopoly licence; GT&T lost the case. The ICT project was designed to improve governance, accountability and transparency in addition to generating employment and providing opportunities for business. Government expenditure on telecom related initiatives, such as this ICT project, are not uncommon in the Caribbean. Regrettably, this project was shelved because GT&T and the government were unable to arrive at a feasible solution for the sector's reform and the termination of GT&T's monopoly.

With regard to WTO agreements, Guyana has made telecom commitments under the Uruguay Round relating to value-added services; however, to-date no commitments have been made under the Fourth Protocol of the General Agreement on Trade in Services (GATS), although it was envisaged that commitments would have been made in tandem with reform of the telecom sector.

Box 2. Reform of the telecom sector in Guyana

In August 2001, Canadian lawyer, Hank Intven, prepared a paper on Guyana's telecom sector. The intent of the paper was not to immediately inform policy decisions, but rather to serve as a catalyst for discussion and debate on issues pertinent to the development of the telecom sector. Intven comprehensively dealt with the issues of the local telecom sector and suggested several options for reform. In particular:

1. The government should establish one regulatory agency for the telecom sector as opposed to multi-agency approach which now exists. Alternatively, Guyana could become a member of a regional regulatory body, with the establishment of the Caribbean single market (CSM), this option should not be ruled out.
2. The current rate of return regime should be replaced with incentive regulation, in keeping with international best practice.

Source: Intven (2001).

3. Guyana's telecom regulatory environment

3.1 Introduction

The period from 1990-1991 marked a watershed in Guyana's TRE with the passing of the Telecommunications Act and the Public Utilities Commission Act. The PUC Act enabled the establishment of the PUC, while the Telecommunications Act provided for the appointment of a Director of Telecommunications whose mandate would include the granting of licences. To-date, this post has not been filled, and the minister responsible for telecom executes the anticipated functions of the Director of Telecommunications.

While the government at the time found it prudent to enact legislation for the regulation of the privatised telecom utility (and other public utilities) it is important to note that there is a fundamental difference between the Telecommunications and PUC Acts, the GT&T licence and the Purchase Agreement. Intven highlighted this fact in his consultancy paper on Guyana's telecom reform: "A number of the concepts of the British-based Telecommunications Act and GT&T license are inconsistent⁵ with those of the Purchase Agreement and PUC Act, with their US-based concepts and terminology" (Intven 2001: 29). Inconsistencies between these important documents naturally would have negatively affected Guyana's TRE.

In addition to the PUC and the Director of Telecommunications, the National Frequency Management Unit (NFMU) is the third agency in Guyana's telecom regulatory triad. It is worth emphasising that given the resource base of the country it would be more prudent for the functions of these three agencies to be integrated into one.

3.2 Methodology of TRE survey

This study follows the methodology developed by Rohan Samarajiva as detailed in the 2005 Sri Lanka case study (see Samarajiva and Dokeniya 2005). Some minor adjustments have been made for this application of the methodology. For example, the refining of the core elements or dimensions of the Basic Telecommunications Reference Paper of GATS Fourth Protocol was retained; however, the dimensions were not always used in the same strict fashion given the dynamics of Guyana's telecom sector. This study seeks to assess the relative state of Guyana's TRE based on the dimensions identified for each segment of the wider telecom sector.

3.2.1 Choosing dimensions and time periods

- Unlike Sri Lanka, Guyana's telecom sector is in a relatively nascent stage of liberalisation and development. Because 1990 marked a watershed in the history of the country's telecom sector, this year was the ideal starting point for assessing the TRE under the fixed line sector. Determining an end point for the first period was not as clear-cut as determining the starting point, especially given the stage of the sector's development. Since the latter part of the 1990s saw changes in the sector, such as the growth in mobile services, amendment of the PUC Act and radical changes in phone rates, the first period was chosen to cover 1990-1998, and the second period 1999-present.
- Given the monopolistic nature of the fixed sector, the dimensions relating to market entry, access to scarce resources, interconnection and regulation of anti-competitive practices were not dealt with here. Rather, only the dimensions of tariff regulation and universal service were considered. Samarajiva and Dokeniya (2005) suggested that universal service is not necessarily a core regulatory function and given the mature status of Sri Lanka's telecom sector this position is understandable. In the case of Guyana, however, universal service is definitely a core regulatory function. Due to the monopolistic nature of fixed line services, GT&T's commitments under the Purchase Agreement and the mandate of the PUC, it would have been remiss not to include this in the assessment of Guyana's TRE.
- During the early years of GT&T's operations, the provision of mobile cellular services was overshadowed by landline service provision. This is understandable given Guyana's level of development and technological advancement at that time. GT&T remained the only licensed mobile cellular provider until 1996. However GT&T was only afforded effective competition with the advent of Cel*Star. Due to the small number of mobile subscribers and the fact that most of the dimensions are more suited for the competitive sector, it was decided that the TRE of the mobile sector would be assessed for the period during which the sector had become competitive. The first period spanned 1996-2000 and the second period 2001-present. The starting point of

2001 was chosen for the second period because it was during this period that Cel*Star was given the right to operate, thus making the sector effectively competitive. Admittedly, it was the opinion of one respondent that the mobile sector is not truly competitive as Cel*Star presents no immediate threat to GT&T's dominance at this time. This view is supported by the fact that apart from increasing its coverage and network efficiency, GT&T has not needed to offer attractive deals to lure and keep subscribers.

- Given that the mobile sector was being assessed during the epoch of competition in that sector, the five dimensions of tariff regulation, interconnection, market access, resource allocation, and anti-competitive behaviour were used. Unlike the fixed sector, universal service was not viewed as a core function or issue, given the costs associated with providing this service relative to the provision of landlines and the rapid growth in subscribers.
- In conclusion, it is apt to note that while the author did not assemble or consult a group of national experts to decide on the dimensions and periods for consideration, comments were sought from knowledgeable persons and colleagues.

3.2.2 Identification of respondents

- Given the author's knowledge of the local environment, a list of possible knowledgeable respondents was drafted and passed on to colleagues for comment and suggestions. In the end, 15 questionnaires were distributed and seven were completed and returned, resulting in a 46% response rate.
- Respondents were drawn from telecom service providers, civil society, the legal profession, academia and government.

3.2.3 Administering of questionnaires

- Questionnaires were given to potential respondents either by hand or via e-mail, naturally the latter medium proved quite useful. In an effort to reduce the length of time that respondents would take to answer and return the questionnaire, the author was advised to conduct interviews. This was not always possible. In cases where interviews were possible, questionnaires were left in advance and a time set for an interview. This arrangement worked out quite well and afforded the respondent time to peruse the questions before the actual interview.
- Although the survey instruments contained sufficient information to enable the respondent to answer, the researcher in some cases expounded on the information provided for respondents.
- When interviews were conducted, although they did not necessarily serve as a major contributor to the assessment

of the TRE, they certainly provided value-added information and would be useful for future studies of this nature.

3.2.4 Calculation of assessments

- In order to determine the average perception of respondents, for each dimension of the TRE, a simple arithmetic average was calculated using the five point Likert scale and the corresponding assessments.

3.3 Assessing Guyana's TRE

3.3.1 Fixed Sector – 1990-1998

3.3.1.1 UNIVERSAL SERVICE

As the sole provider of landline services in Guyana, GT&T is responsible for ensuring universal service. The PUC mandate is to ensure that GT&T does not renege on this important responsibility. Although many would argue that GT&T has significantly transformed the telecom landscape in Guyana, it would be remiss to conclude that universal service during this period was satisfactory.

The average score allocated by the respondents for this dimension of the TRE, for the period under review, was 1.7 or unsatisfactory. In 1996, the then PUC chairman, Mr. P.J. Menon, took GT&T to task by issuing a press release on 19 August.⁶ The chairman asserted that GT&T had “never fulfilled its contractual obligations, as are explicitly stated in the Government of Guyana-Atlantic Tele-Network (ATN) agreement of June 1990 and in the license issued to the new GT&T.” He added, “the company did not complete the programme of work outlined in its own original development plan within the stipulated period despite two extensions granted for this purpose.”

In reply, GT&T cited the devaluation of the Guyana dollar,⁷ coupled with low telephone rates, as the key reasons for its inability to execute its expansion program.⁸ Naturally, the PUC disagreed, and Menon further recalled that in the purchase agreement GT&T had stated that it had “the requisite human resources and capital and ability to raise financing to perform all of its obligations and undertakings.”⁹ However, it is relevant to note that GT&T had also agreed to keep phone rates constant, unless there was devaluation in the Guyana dollar, *inter alia*. Therefore, while the PUC is correct in alluding to GT&T's early confidence in raising funds it is possible that such confidence was expressed *ceteris paribus*.

3.3.1.2 TARIFF REGULATION

The perception of the dimension of tariff regulation was assessed as unsatisfactory (2). Given the state of the regulatory environment during the period 1990-1998, and relative to the period 1999-present, this dimension is better described as poor. From the inception of GT&T's operation in the year 1991, the ugly problem of tariff battles emerged. In 1991, GT&T management unilaterally decided to increase telephone rates by 200%. The company's position was that in light of the devaluation

of the Guyana dollar,¹⁰ increased rates were a necessary response, in particular to ensure a 15% rate of return.

Then Deputy Prime Minister Mr. Robert Corbin stated in response to GT&T's decision, “I am a little concerned that the company, at such an early stage, has not seen fit to stick to the agreement.”¹¹ Interestingly, the PUC commissioners had only been appointed a week earlier and had yet to be sworn in. It is rather surprising that the PUC – whose mandate it is to regulate public utilities such as GT&T – was not yet fully functional, while GT&T had already commenced operations. These events could be viewed as starting on the wrong foot, or as an ominous sign of things to come. After this initial presumptuous move by GT&T, there were other battles over tariffs. Over time the PUC was recognised by GT&T and as such applications were made for rate increases. This recognition did not translate into smooth and timely resolutions of tariff issues.

3.3.2 Fixed Sector – 1999-present

3.3.2.1 UNIVERSAL SERVICE

Universal service for the period 1999-present received an average score of 2.7 and is therefore assessed as neutral, which is a clear improvement from the poor assessment of the previous period. The improvement in the TRE as it relates to universal service is attributable in part to the pressure placed on GT&T during the latter part of the period 1990-1998.

On 31 October 1997, the PUC issued an order for GT&T to increase its provision of telephone lines and to implement new services.¹² The order specified that the incumbent must increase the number of lines to approximately 102,000 by 2000, with increases of 69,278 and 89,054 lines during 1998 and 1999 respectively. These increases exceeded GT&T's proposal in its 1996 three-year Expansion and Service Improvement Plan (ESIP). Unsurprisingly, these projections were not met; in fact the company only achieved 102,000 lines in 2004. Despite the foregoing, however, the TRE as it relates to universal service was certainly better than during the previous period, and the PUC's actions likely were a strong factor. It should be noted that the rapid growth in the mobile cellular sector during this period would have relieved GT&T from some degree of public pressure. It was not uncommon for entire communities to protest outside GT&T's offices about the insufficient provision (or complete lack in some cases) of landlines.

3.3.2.2 TARIFF REGULATION

The regulation of tariffs for this period was assessed as unsatisfactory (2.3), indicating an improvement over the previous period. However, this period was also characterised by disputes between the PUC and GT&T for protracted periods.

The central issue of concern regarding tariff regulation for this period was the reduction in settlement rates by the Federal Communications Commission (FCC) of the United States. The FCC had indicated from as early as 1998 the intention to reduce the settlement rate for calls to Guyana originating in the US, from USD 0.85 to USD 0.23. The FCC lived up to its intentions by introducing the benchmark 23 cents settlement

rate in January 2001. Further, the growth of Internet cafes providing VoIP services also contributed to decreased overseas revenues.¹³ Naturally, GT&T proposed increases in telephone rates to offset this reduction.

On 21 December 2001, the PUC rejected GT&T’s application for an increase in telephone rates. In December of the previous year, GT&T had requested increases for intra-exchange rates by approximately 1900% and inter-exchange calls by 75%.

3.3.3 General comments

During the two periods under review, *unsatisfactory* best describes Guyana’s TRE in the fixed sector. This perception is supported by assessments of the universal service and tariff regulation dimensions of the sector. The survey yielded overall scores of 1.9 and 2.5 for the two periods, thus resulting in an average score of 2.2 for the fixed line sector (see Table 5).

It is interesting to note that the two dimensions considered for the fixed line sector are interdependent. This is highlighted by the fact that GT&T was promised a minimum 15% return on its investment and consequently agreed to a plan for increasing the number of functional lines. Given the numerous battles between the PUC and GT&T on the issue of phone rates it is no surprise that the PUC also had a hard time getting GT&T to live up to its obligations relating to universal service.

These battles over telephone rates having been fought primarily in court does not reflect well on the ability of the PUC to effectively execute its mandate. Further, when these matters between the PUC and GT&T are taken to court, the time needed to resolve the issue(s) can be very lengthy, ultimately affecting all stakeholders.¹⁴

Change to the original PUC Act of 1990 was initiated primarily with the intention of adjusting the PUC Act to bring it in line with the GT&T licence. However, this amendment did not significantly change the TRE. This first amendment resulted in the PUC Act of 1997 (this Act was itself amended in 1999). Some respondents felt that the amendment weakened the power of the PUC to regulate GT&T. A member of parliament commented that the amendment resulted in “making the agency [PUC] a toothless poodle” and accused the government of going to bed with GT&T when it forced this amendment through the house.¹⁵

Finally, the apparent lack of good corporate behaviour by GT&T as relates to the provision of audiotext services (see Box 3) further contributed to the unsatisfactory performance of the sector for the period under review.

3.3.4 Fixed sector TRE & investment

Investment decisions within the fixed sector mainly concern expansion of GT&T’s services, and by extension its equipment, since the purchase agreement prohibits the entrance of new firms wishing to provide landline services.

The poor state of the fixed sector TRE for 1990-1998, relative to 1999-present, would have impacted negatively on GT&T’s investment decisions. As evidenced by the choice of dimensions for the fixed sector, the primary concerns of the fixed sec-

tor, then and now, are universal service and tariff regulation. GT&T has often accused the PUC of not allowing it to charge feasible rates, while the PUC has often lamented GT&T’s failure to live up to its obligations regarding universal service. GT&T has contended that it cannot do so given the PUC’s reluctance to allow feasible rate increases. An excerpt from the GT&T *Blue Book* (2004) highlights this point:

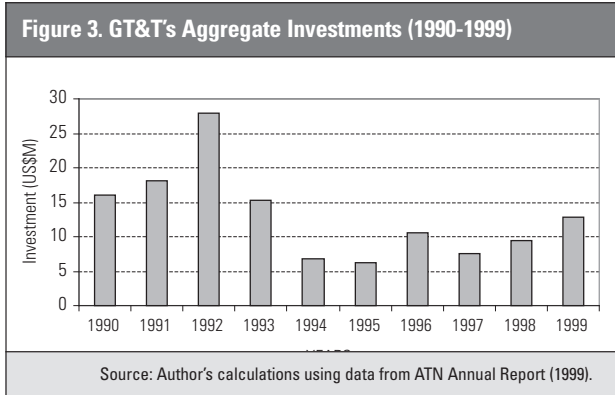
Contrary to what certain regulatory and Government officials would have the public believe, GT&T did fulfil its commitment to install 20,000 new lines during the first three years of operation. If that momentum was not maintained, it was because of punitive and prejudicial regulatory actions at that time. The actions make investors less inclined to commit resources because of the risks they perceive.

Figure 3 shows GT&T’s annual investments for 1990-1999. Of particular importance are the relatively sizable investments for the early years.

GT&T’s contention is supported by Samarajiva and Dokeniya (2005), who note that, “once a firm is in a market, deterioration in the TRE might depress the level of investment, but will not necessarily lead to no investment or to withdrawal.” Further, “investment decisions after entry are driven to a great extent by the desire to protect and enhance the initial investment.” However, due to GT&T’s monopoly position in the local market there was little urgency to “protect and enhance their investment.” Pressure from the PUC led to the company increasing the number of phone lines, but many areas still remain underserved, and the company’s focus has

Table 5. Assessment of the Fixed Sector’s TRE

Dimensions	1990-1998	1999-Present
Universal Service	Unsatisfactory (1.7)	Neutral (2.7)
Tariff regulations	Unsatisfactory (2)	Unsatisfactory (2.3)
Overall Assessment	Unsatisfactory (1.9)	Unsatisfactory (2.5)



Box 3 – The audio-text bombshell

During the mid-1990s, the Guyanese public learned that GT&T was operating an audio-text service (phone sex service), without the knowledge of the PUC, the government or the wider Guyanese society. The company was making millions of dollars from this service. Foreign persons wishing to engage in such activities would call a sex hotline number with the Guyana code +592, and since these calls terminated in Guyana, GT&T received a settlement rate.

Joseph Tyndall, the first Chairman of the PUC, and the Consumer Advisory Bureau (CAB) made a submission to the FCC, accusing Atlantic Tele-Network Inc. (ATN – the parent company of GT&T) of secretly facilitating audio-text services.* The submission asserted that ATN’s staff was fully responsible for the operations in Georgetown, and as such local Guyanese staff might not have been fully aware of the service.

The moral rectitude of such a service was not the primary point of contention; rather, it was the manner in which the service was conducted that is relevant to the TRE. Without a doubt, GT&T made substantial amounts of money from the audio-text business. However, the manner in which GT&T treated this revenue in its financial reports is cause for concern.

In the submission prepared by Tyndall and the CAB, it was stated that, “the great paradox is that GT&T does not earn any revenues from the provision of audio-text services. What GT&T does is to attribute a share of the settlement

revenues from certain sources, mainly the US to its audio-text business.” The submission also noted that, “information provided in ATN’s documents shows quite clearly that GT&T has not entered into any agreement with US and other carriers for the collection of audio-text services or for the transfer of revenues from this source.”

In other words, Tyndall and the CAB contended that GT&T did not have a contract covering audio-text revenues from US carriers, and as such, any revenue earned from such activity should have been regarded as part of all settlement revenues for calls terminating in Guyana. After all, the infrastructure used for the audio-text business was not purchased separately from that needed for the provision of international service to Guyana.

The initial secrecy surrounding the audio-text business certainly added to the tenuous state of the TRE, and would have tainted GT&T’s reputation in the eyes of the PUC and the people of Guyana.

Audio-text contributions to GT&T

	1993	1994	1995	1996	1997	1998
Contribution to Revenue	23.56%	49.61%	70.82%	73.37	53%	45%
Contribution to Profit	2.9 M	14.8 M	37.1 M	40.3 M	11.8 M	—

* See Tyndall and Consumer Advisory Bureau (1996).

shifted somewhat to the mobile sector, where the number of subscribers has overtaken that of the fixed sector.

3.3.5 Mobile Sector – 1996-2000

This period marked the end of GT&T’s monopoly in Guyana’s telecom sector. During this period two companies were granted licences to operate. However, this development did not drastically revolutionise the local wireless telecom sector.

3.3.5.1 REGULATION OF ANTI-COMPETITIVE PRACTICES

Assessment by the respondents for this dimension was unsatisfactory (a score of 2), which is the same as for interconnection, for the period 1996-2000. The primary example of anti-competitive behaviour would have to be GT&T’s interconnection dispute with Caribbean Telecommunications Ltd. (CTL) as explained in the section on interconnection below.

3.3.5.2 INTERCONNECTION

Interconnection for the period under review was assessed as unsatisfactory (2). The incumbent, GT&T, was embroiled in a dispute with the newly licensed company, CTL, over interconnection. CTL received its licence in 1996 and in the following year, the PUC ordered GT&T to interconnect with the company.

CTL accused GT&T of refusing interconnection and manoeuvring for control of the local mobile market in addition to charging higher mobile rates relative to those charged by CTL. CTL offered rates between GYD 40.00 and GYD 25.00 per minute, while GT&T’s lowest rate was GYD 40.00.¹⁶ In response to the allegations levelled by CTL, GT&T contended that it was indeed willing to interconnect with CTL, but claimed that CTL was not willing to pay the interconnection fees.

The case with CTL was only the first instance in which GT&T was accused of acting unfairly. Caribbean Wireless Telecommunications LLC (CWT) also accused the incumbent of unfair treatment.

It should be noted that while GT&T is obligated to interconnect with licensed companies, the basis for interconnection and the rights of start-up firms are only stated in GT&T’s licence.¹⁷ Additionally, the company uses its interconnection template as a guide to instituting interconnection with other companies. Clearly, this tenuous arrangement does not bode well for proper regulation, and as such contributes to the unsatisfactory assessment of the sector under this dimension.

3.3.5.3 MARKET ENTRY

While the score given by respondents indicates that market entry for this period was unsatisfactory (2.3), it might be more

prudent to describe this dimension as neutral. The reason for this lies in the fact that there were no major issues relating to the licensing of telecom service providers. In fact, the willingness of the government to open the mobile sector to competition resulted in the licensing of two companies, CTL and CWT.

In his consultation paper, Intven (2001: 44) noted inconsistencies between the Purchase Agreement and the GT&T licence. These documents are based on two different legal foundations, American legal concepts on the one hand and British legal concepts on the other. According to Intven this has resulted in “considerable discussion and dispute” concerning constraints on the power of the minister responsible for communications to grant licences.

Intven further contended “the current licensing regime is also unclear” and cited the example of distinctions between licensing of services and facilities. The Telecommunications Act (British in nature) regards licensing as “the running of telecommunication systems” while the Purchase Agreement and the PUC Act (both American in nature) are concerned with “licensing or regulating services.” While the foregoing anomalies are concerned generally with the telecommunications sector, it is apposite to use them in assessing market entry in the mobile sector. Additionally, according to one respondent, there is a degree of unpredictability and lack of transparency in the licensing regime. Therefore, while there have been positives in the licensing of new entrants, the overarching inconsistencies, coupled with the poor licensing regime, result in a neutral assessment of this dimension.

3.3.5.4 TARIFF REGULATION

The perception of the respondents for this dimension is unsatisfactory (2.3). While the issue of tariff regulation was not relatively contentious for the period under review, the perception of the respondents might have been influenced by the overall unsatisfactory state of the TRE. Moreover, one respondent felt that the TRE under this dimension was poor – when his score is excluded, the average perception moves up to neutral.

In November 1997, the PUC approved temporary rates for the start-up cellular company CTL, at the same time GT&T was ordered to interconnect with the company. The approval of these rates were not met with hostility from GT&T; rather, there was discontent between the two firms on the issue of interconnection.

3.3.5.5 ACCESS TO SCARCE RESOURCES

The assessment of the mobile sector's TRE as it relates to this dimension is neutral (3). Scarce resources for the sector within Guyana primarily concern spectrum allocation and to some extent the rights of way and use of land for housing telecom infrastructure. Guyana is actually well endowed in these areas, and when coupled with the fact that the market for telecom services is relatively small and comprises only three mobile service providers, it is easy to understand why there has not been much competition for these resources.

3.3.6 Mobile sector – 2001-present

While 1996-2000 saw the introduction of competition, it was during this second period that the mobile sector truly became competitive with the licensing of Cel*Star Inc. – GT&T's main rival.

3.3.6.1 REGULATION AND ANTI-COMPETITIVE PRACTICES

Again, unsatisfactory is the assessment for this dimension (with a score of 2). The GT&T/Cel*Star issue can be viewed as the primary contributor to this assessment. One respondent assessed this dimension of the TRE as poor for the period under review.

3.3.6.2 INTERCONNECTION

The central issue regarding interconnection for this period has to do with the dispute between Cel*Star and GT&T. The trend has been that every start-up mobile cellular company has had an issue with the incumbent over interconnection. In the case of Cel*Star, GT&T signed an agreement with the operator in April 2003, and subsequently failed to come through on its obligations, alleging that it was unable to interconnect because of an ongoing dispute regarding Cel*Star ownership.

The PUC subsequently sought recourse in the Court of Appeal (the highest court in Guyana at that time). The issue for the court was whether the PUC's mandate allowed it to order GT&T to interconnect with Cel*Star on a temporary basis pending the result of the ownership dispute.¹⁸ The Court of Appeal later ruled that the PUC had both the jurisdiction and power to order GT&T to temporarily interconnect with Cel*Star.

The protracted period of time before interconnection materialised between the two parties coupled with the fact that the matter had to engage the highest court of the land certainly warrants an assessment of unsatisfactory for this dimension. The respondents' average assessment score of 2.3 for interconnection is not significantly different from that of the previous period.

3.3.6.3 MARKET ENTRY

While the assessment by the respondents on this dimension was 2.7 as compared to 2.3 for the first period, there was no significant change for this dimension of the TRE. During the period under review, Cel*Star Inc. was granted a licence to operate. However, the concerns raised in the previous period under this dimension still hold true. Therefore, the TRE as it relates to market entry does not differ significantly from the previous period.

3.3.6.4 TARIFF REGULATION

For the most part, tariff regulation was good. However, as the study was being conducted there was some controversy around the reduction of rates by Cel*Star for the purpose of a Christmas promotion. GT&T felt that such a reduction is nothing short of predatory pricing and took its claim to the PUC. A local newspaper column entitled *Consumer Concerns* reprint-

ed a statement made by former PUC head, Joseph Tyndall. He asserted that, “there was no good reason for the commission to control the rates charged by a start-up company entering into competition with a dominant incumbent, since the new provider would not be able to charge rates that are higher than the incumbent’s. If the new incumbent has the ability to offer lower rates this should force the incumbent to take steps to match the competitor in price and quality.” About one week before Christmas (December 2005), the PUC granted Cel*Star approval to launch its Christmas promotion.

The average perception of tariff regulation for 1999-present was again distorted by an outlier, thus resulting in an average score of 2.5 (unsatisfactory). Removal of the one very negative assessment increases the score to neutral (2.8).

3.3.6.5 ACCESS TO SCARCE RESOURCES

The assessment of this dimension for the period under consideration is the same as for the previous period and in large part for the same reasons. In 2001, there was a case in which a company called i-net was accused of operating illegally. The NFMU, in its capacity as the responsible agency, monitored the situation and could have shut down and seized the company’s equipment if ordered to do so by the minister responsible for telecoms. This incident aside, spectrum allocation might become a major issue as the sector develops. In response to the government’s intention to eventually give Digicel (a large telecom service provider operating in many Caribbean countries) a licence, GT&T contended that the government’s proposed frequency division plan could lead to significant congestion during the upcoming elections and the Cricket World Cup in 2007.¹⁹ Previously, GT&T had made investments based on a 50% spectrum allocation in the 900 MHz band. However, according to the company the new plan, which proposes four blocks of 25% each, will result in the company incurring more costs. GT&T suggested to the NFMU that 33% could be allocated to each provider – Cel*Star, GT&T and Digicel when it comes on board – thus ensuring the sector is competitive while simultaneously reducing GT&T’s increased cost. Where this issue will end up is not clear at this time.

During an interview for this study one respondent described spectrum allocation as a give away, since in his opinion too little was charged. However, another respondent posited that because of the number of mobile service providers and the size of the Guyanese market, it would have been counter-productive to engage in activities such as spectrum auctions. In other words, the demand for spectrum was low as compared to supply, so much so that mobile phone companies would not pay anything significantly more than what they are currently paying for spectrum use if the resource were auctioned off. Additionally, given the stage of Guyana’s development, charging higher prices for spectrum would certainly hinder the growth and development of the sector, and by extension the country as a whole.

3.3.7 General comments

While the average score for the mobile segment of the telecom sector is 2.4 it would be prudent to assess the TRE for the mobile sector as generally unsatisfactory. However, relative to the fixed line sector the mobile sector can be considered to have a slightly better TRE. The fact that both sectors make up the local telecoms sector naturally suggests that their performances are interdependent. In other words, the unsatisfactory state of the fixed line sector would have certainly affected the *status quo* of the mobile sector. Further, the growth of competition in the mobile sector would eventually lead to positive externalities in the fixed line sector.

3.3.8 Mobile sector TRE and investment

While the overall condition of the TRE would have affected the level of investment in the mobile sector over the years, the issue of interconnection seems to be the Achilles heel. Intven (2001) contended that, “As in most countries, the establishment of clear interconnection arrangements is a pre-requisite for the development of effective cellular competition in Guyana.” In relative terms the TRE as it concerns interconnection saw a small improvement from the period 1996-2000 to the period 2001-present. The average scores obtained for this dimension (see Table 6) support this view. This relative improvement is further supported by the fact that prior to the establishment of Cel*Star the mobile sector was in its early stages of competition and development, and the lone operating competitor to GT&T at that time, CTL, was not a serious competitor given its location and size. With the licensing and eventual interconnection of Cel*Star with GT&T, effective competition in the mobile sector was becoming a reality. Admittedly, GT&T still plays a largely dominant role in this part of the sector and consumers have not yet been able to benefit from lower rates and increased quality of service. In fact, the service from both providers is sometimes poor, and it is not surprising for consumers to be greeted with the message “Sorry, no circuits are available at this time.”

The TRE for the mobile sector seems to be improving as the sector matures (see overall score in Table 6). An example of this is the PUC ruling in January 2006 that Cel*Star’s application for

Table 6. Assessment of the Mobile Sector’s TRE		
Dimensions	1996-2000	2001-Present
Regulation of anti-competitive practices	Unsatisfactory (2.0)	Unsatisfactory (2.0)
Interconnection	Unsatisfactory (2.0)	Unsatisfactory (2.3)
Market entry	Unsatisfactory (2.3)	Neutral (2.7)
Tariff regulation	Unsatisfactory (2.3)	Unsatisfactory (2.5)
Access to scarce resources	Neutral (3.0)	Neutral (3.2)
Overall Assessment	Unsatisfactory (2.2)	Unsatisfactory (2.4)

a reduction in its rate was not predatory pricing, as claimed by GT&T.²⁰ Additionally, there have been recent new investments by both Cel*Star and GT&T in an effort to improve the quality and range of their services. At the time of writing GT&T is celebrating its 15th anniversary, and is using this milestone to open four new mobile cellular sites, worth approximately USD 1 million, within and outside of the city of Georgetown. Increased investments in the mobile cellular market are expected to continue into the near future. At the end of 2005, Cel*Star had 42 mobile cellular sites and on 20 January 2006 the company's Chief Operations Officer, Pierre Strasser, indicated that the company hoped to increase the number of sites to 95, a more than 100% increase.²¹ Strasser admitted that the company was in conversation with companies such as Cable & Wireless and Digicel regarding the possible takeover of Cel*Star. Both Cable & Wireless and Digicel have a strong regional presence. On 20 February 2006, the President of Guyana indicated the government's intention to grant Digicel a licence to operate in the local mobile cellular market.²²

It is important to note that the dominant provider, GT&T, operated a TDMA service prior to Cel*Star being granted a licence. With Cel*Star waiting in the wings to introduce its GSM service, it would have been remiss of GT&T not to introduce a similar service. In the end, GT&T launched its GSM service a few months before Cel*Star. Samarajiva and Dokeniya (2005) comment "its peaks [investments] and valleys are explained more in terms of changes in standards, than in terms of TRE." This view partly explains GT&T's investment decision with regards to the GSM 900 service. However, further investing to protect and enhance its investment seems to be the better explanation in this instance. The global telecoms sector seems to be moving more and more towards the GSM mobile cellular platform. However, it is apposite to note that GT&T still provides a TDMA service – with a virtual monopoly for this sector – and will continue to do so until around 2008.

Despite recent increases in investment in the mobile sector, the pace at which the TRE improves hinges critically on the comprehensive reform of the telecom sector. Regrettably, the reform train has stopped and there is no certain timeframe for its restart.²³ In his policy paper, Intven (2001) posited "there appears to be a number of reasons for the slow development of competition in the cellular market, including regulatory uncertainty and lack of financing on the part of competitors." While these two hindrances to investment and competition can be considered in isolation of each other, it is important to note that the lack of financing will be further compounded by regulatory uncertainty since the latter makes investment more risky. Intven in support of this view noted, "the cellular competitors have stated that the regulatory uncertainty has affected their ability to finance their service roll-outs."

4. Comments and recommendations for further TRE assessments

Generally, Guyana's TRE assessment, as derived from responses to the questionnaire, closely mirrors the opinion of the author. In fact, only in the case of tariff regulation assessment did the opinion of the author differ from that of the average respondent. For the mobile sector assessment, the perception of one respondent (negatively) affected the average. Certainly a larger sample size would have corrected this.

Collecting data and information can be a very daunting task, and this study was no different. As noted earlier the response rate of contacted knowledgeable persons was approximately 46%. Regrettably, no cooperation was received from some key players. On the other hand, reports and other materials were readily available. While a better response rate was not expected to significantly alter the assessment, the additional comments from other stakeholders would have certainly added some value to the analysis. Additionally, a higher response rate would have increased the reliability of the assessment for the different dimensions.

The following are recommendations that can be considered for future studies of the TRE, especially in developing countries such as Guyana.

1. While it would be worthwhile to assemble a national group of experts in one place so as to decide on possible respondents, it would be easier for the author/researcher to compile a list based on his/her knowledge of the sector. Additionally, this list could then be passed on to knowledgeable persons or experts in the field who could then comment on the selection and add other names as they see fit. Such an approach is not time consuming and the list could be circulated via e-mail.
2. Given the nature of the exercise, it is useful to conduct interviews with respondents and/or provide spaces for general as well as dimension specific comments. Insights and deeper understanding of particular events or phenomena can be garnered from interviews, and this practice certainly adds to the objectivity and soundness of such a study. This in no way suggests that interviews are a must; rather, they can complement the TRE assessment, and prove useful to the researcher in his/her analysis. Interviews, however, are not always feasible, especially in instances where the respondents are not easily accessible. During the execution of this study, the author was fortunate to have two interviews, during which the respondents simultaneously answered the questionnaire. The value of such comments is pretty obvious.
3. While there is some merit to deciding on the weighting given to specific dimensions (interconnection, tariff regulations, etc.) depending on the dynamics of a particular telecom sector, such a move might only be feasible in a situation in which the assessment is not done for comparison with other countries. In other words, since the dynam-

ics of telecom sectors vary between countries, even those with similar levels of development, it would be more prudent to give all dimensions the same weighting if the assessment is to be done for comparison purposes.

4. If countries are to be assessed for international comparison, it might be useful to construct separate indices, or give their dimensions different weights to distinguish between countries that have a monopoly provider and those that do not. For example, Guyana's fixed sector is not a competitive one, therefore for comparative purposes it would be remiss to compare Guyana's fixed sector TRE with that of a country that has a competitive fixed sector. Admittedly, the dynamics vary even between countries at similar levels of development, but at the same time countries can be separated into two or more groups in the same fashion that the UNDP separates countries according to high, medium and low levels of development. The central idea here is not to compare a Toyota with a Rolls Royce.
5. It would be worthwhile if questionnaires are not only designed to determine the perception of respondents on the relative state of the TRE, but also to solicit perceptions on how the TRE affects the level of investment. The Likert scale would be ideal once again.

5. Conclusion

In light of the evidence presented in this study, unsatisfactory is the most fitting general assessment of Guyana's TRE. The survey of knowledgeable persons supports this general description. In fact, the overall score for both sectors is 2.3. This undesirable condition of Guyana's TRE is a result of some fundamental issues.

First, there is the issue of inconsistencies between the relevant Acts, the Purchase Agreement and the GT&T licence. While some effort was made to bring the PUC Act in line with the GT&T licence, much more needs to be done, especially as regards issues such as interconnection. Additionally, the lack of a comprehensive National Telecommunications Policy further compounds the unsatisfactory framework within which firms operate.

Another reason for the poor state of Guyana's TRE is the conduct of GT&T. While the incumbent is entitled to charge rates that reflect its costs and guarantee its rate of return, the company has not always behaved in the manner of a good corporate citizen. The secrecy with which the company conducted its audio-text business and the dubious definition of the revenue derived from this activity merely added salt to the wound of suspicion, thus contributing to the tenuous state of Guyana's TRE (Tyndall and CAB 1996).

A third fundamental issue concerns the lack of technical human resource capacity at the regulatory agencies. This problem is not unique to Guyana; rather, it is an inherent characteristic of developing countries. Naturally, the lack of technical

capacity would have hindered the PUC's execution of its mandate. Further, much needed financial resources were lacking to hire consultants with the requisite technical skills needed to get the job done.

Finally, given the nascent stage of liberalisation in Guyana's telecom sector coupled with the socio-economic realities of the country, it is not surprising that the TRE is in a relatively unsatisfactory state. The protracted time for the resolution of disputes is a good example of one of the deficiencies that is characteristic of a developing country like Guyana.

It goes without saying that the primary movers and/or shapers of Guyana's TRE are GT&T and the government. Therefore, it is only natural that the improvement in Guyana's TRE rests squarely on the shoulders of these two major stakeholders, with the government taking the majority of the responsibility.

As a start, the Telecommunications Act and the PUC Act need to be amended, and the GT&T licence modified. Such changes should not occur in isolation but rather they should be made in tandem with a general national development plan. In other words, the long awaited National Telecommunications Policy should be completed, with the regulatory framework being a key component. Additionally, the forthcoming Competition and Fair Trading Act²⁴ will be a welcome addition to Guyana's TRE. In order to complement the aforementioned, the GT&T licence should be modified to reflect the changing realities of telecoms locally, regionally and internationally – e.g. the early end of the incumbent's monopoly status and rate of return regulation should be replaced by incentive based regulation. Such changes will most certainly rely on ATN's goodwill, given that GT&T happens to be the most profitable of its subsidiaries.

For the effective running of the regulatory agencies, adequate financial and human resources are needed. To this end, the government must ensure that adequate financial resources are made available to the PUC, thus enabling it to carry out such functions as economic research, which would certainly aid in objective decision-making. Access to adequate financial resources, however, is useless unless there is a good cadre of personnel available. It is imperative that the government seeks to improve the quality and quantity of human resources available to the regulatory agencies.

In terms of this study, the big question is whether an improved TRE will result in increased investment. This study has supported the assertion that the state of a country's TRE can affect the level of telecom investment, as a poor or unsatisfactory regulatory environment can add to perceived risk. Bohlin, et al. (2004) conclude that "the relationship between regulatory reform and network investments is still unsatisfactorily understood from the research literature," thus bringing into question the impact of an improved TRE on the level of investment. Samarajiva and Dokeniya (2005) conclude that "the question of the effect of TRE on investment decisions makes sense only in an environment where market forces dominate." For Guyana, market forces do not dominate either

segment of the sector, although the mobile sector is moving towards increased competition where market forces are more likely to exist. Bohlin et al. also posited that “operators will invest in equipment and infrastructure when their financial strengths allow them to, and when the discounted accumulated financial returns can be expected to exceed the level of investment.” It would seem that the licensed firms, CTL and CWT, did not have the financial muscle to make significant investments in Guyana. GT&T’s dominance and the unsatisfactory TRE would have further compounded their situation. On the other hand Digicel certainly has the necessary finances.

In conclusion, the unsatisfactory TRE has and will continue to affect telecom investment in Guyana, unless the sector is reformed. On the other hand, a reformed sector, and by extension the TRE, will not necessarily result in significant increases in telecom investment without wider and deeper reform of public institutions, and improvement in the macroeconomic and business environment. Moreover, the relatively small size of the population will certainly constrain expansion after a certain point. In other words, an improved TRE is a necessary but not a sufficient condition for increased telecommunications investment in Guyana.

Notes

¹ While Internet service providers are a part of the local telecom sector this study focuses on the regulation of landline and mobile cellular services providers.

² Intven (2001) speculated that at that time CTL had approximately 100 subscribers.

³ While it would have been prudent to consider the investments by all firms in the sector, information was not readily available on the level of investment of the other firms, over time.

⁴ Stabroek News (2005). “Telecoms reform a no-go – info tech project shelved, technical co-op pact halted,” Guyana Publications Inc. 26 September, p.10.

⁵ See example in Section 3.3.5.3.

⁶ Guyana Chronicle (1996). “Commission slams GT&T,” Guyana Newspapers Ltd. 20 August, pp.1&10.

⁷ The Guyana dollar was devalued by about 180% between 1990 and 1991.

⁸ Guyana Chronicle (1996). “PUC upbraids GT&T on expansion programme-phone company declines comment,” Guyana National Newspapers Ltd., 24 August.

⁹ Ibid.

¹⁰ The nominal devaluation of the currency was from GYD 49.00 per USD 1.00, to GYD 123.00 per USD 1.00.

¹¹ Stabroek News (1991). “Phone rates row could reach court,” Guyana Publications Inc. 21 March, p.1.

¹² Guyana Chronicle (1997). “PUC orders GT&T to provide additional lines,” Guyana National Newspapers Ltd. 3 November.

¹³ Because of cheap Internet calls, GT&T was forced to reduce its rates to countries such as the US and Canada.

¹⁴ Consumer Advocate Ms. Eileen Cox bemoaned the long delays in the conclusion of cases between GT&T and the PUC in a 1999 Consumer Corner article, “Consumer Concerns, Long delays in conclusion of phone cases worrying.”

¹⁵ Stabroek News (2000). “Mixed political reaction to phone company retaining monopoly,” Guyana Publications Inc. 20 February.

¹⁶ Prices are quoted in Guyana Dollars (USD 1.00 = GYD 200.00)

¹⁷ Information garnered from a respondent.

¹⁸ Stabroek News (2004). “Cel*Star/GT&T impasse- PUC explores authority to order interconnection,” Guyana Publications Inc. 4 July.

¹⁹ Stabroek News (2006). “GT&T says frequency sharing plan could pose elections, world cup problems,” Guyana Publications Inc. 24 February, p.10.

²⁰ Stabroek News (2006). “Cel*Star rate filling not predatory, PUC rules – but reductions still to be considered,” Guyana Publications Inc. 3 February, p.15.

²¹ Stabroek News (2006). “U-Mobile eyes expansion – in discussion with Digicel, others,” Guyana Publications Inc. 21 January, p.10.

²² Stabroek News (2006). “Digicel to be licensed here shortly – Jagdeo vows again to break GT&T monopoly,” Guyana Publication Inc. 22 February, p.13.

²³ Stabroek News (2005). “Telecoms reform a no-go – info tech project shelved, technical co-op pact halted,” Guyana Publications Inc. 26 September, p.10.

²⁴ Eileen Cox (2005). “Consumer Concerns, Fair trading bill should allow for competition in the telecommunications industry,” in Stabroek News. Guyana Publications Inc. 11 December.

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Annex 1. Time line of events in Guyana's telecommunications sector

- 1990 Telecommunications Act 1990 (ACT No. 27 of 1990)
- 1990 Public Utilities Commission Act 1990 (ACT No. 26 of 1990)
- 1990 GT&T authorized to provide telecommunications services on December 19th 1990.
- 1996 Caribbean Telecommunications Limited (CTL) was licensed to provide wireless services on April 23rd 1996.
- 1997 Public Utilities Commission Act 1997 (ACT No. 29 of 1997)
- 1999 Public Utilities Commission Act 1999 (ACT No. 10 of 1999)
- 2000 Caribbean Wireless Telecom, LLC, was licensed to provide cellular services on April 19th 2000.
- 2001 Cel*Star Guyana Inc., was licensed to provide cellular service on February 21st 2001.

Annex 2. The PUC, NFMU and the Office of the Director of Telecommunications

Public Utilities Commission

298 Church Street,
Queenstown, Georgetown,
Guyana
Tel: 227-3293

Mission:

'To ensure that regulated utilities offer efficient service to the consumer at a reasonable cost'
'To protect the rights of all stakeholders'

Vision:

'To create an environment in which there is universal access to service in the public utilities sector, as well as a high quality of service which are cost effective as well as beneficial to all stakeholders'

Objectives:

- To establish and enforce rules and procedures for the regulation of public utilities, commensurate with internationally accepted regulatory standards.
- To promote and regulate the efficient long-term provision of utility services for national development consistent with Government policy.
- To provide a fair environment conducive to business interest and investment in the public utilities sector, and in the interest of consumers.
- To investigate and resolve in a timely manner complaints filed with the commission against any public utility.
- To carry out its functions/mandates in a fair, transparent and independent manner.

The PUC and its Functions:

The PUC was established in the 1990 by an Act of parliament, which was repealed and replaced by an amended Act in 1999. The commission consists of a Chairman who serves on a full time basis, and four Commissioners.

The PUC ACT of 1999 enables the PUC to execute the following, inter alia:

- Act as an advisor to the Minister on matters pertaining to public utilities
- Conduct economic research on issues which would offer necessary assistance to the commission in the execution of its mandate
- Initiate and conduct investigations into the operations of and quality of service provided by any public utility

- Consider and grant approval of proposed increases in utility rates
 - Ensure that utility companies live up to their service provision obligations e.g. expansion and development of utility services as specified in initial agreements
 - Fix hearings for the resolving of matters regarding a utility and complainant or consumer
 - Request the submission of detailed reports on financial statements, property evaluation statements and other statements as may be deemed fit by the PUC.
- 2) Closely monitors national, regional and international developments relating to the telecommunication sector.
 - 3) Disseminates information as he deems fitting to suppliers, consumers and other users of local telecommunication services
 - 4) Can order a firm to submit information on its operations, as long as there is reasonable cause
 - 5) Establishes advisory bodies to assist him in the execution of his mandate
 - 6) Regulates access and interconnection rates

National Frequency Management Unit

68 Hadfield Street
D'Urban Park, Georgetown
Guyana
Tel: 592-226-2233
E-mail: nfm@sdnp.org.gy

The primary function of the NFMU is to effectively manage Guyana's electromagnetic spectrum. To this end the NFMU allocates, licenses, monitors, and coordinates spectrum use, it also administers the country's number resources.

Director of Telecommunications

As noted earlier, the office of the Director of Telecommunications is still vacant, therefore the minister responsible for communications executes the functions of the office. However, while there has been no substantive Director of Telecommunications, it would be apt to identify some of the functions of this office as outlined in the Telecommunications Act of 1990. Moreover, the act provides for the close cooperation between the Minister responsible for telecommunications and the Director of Telecommunications e.g. as it relates to licensing of a telecommunications system, under Part 2, Section 7 (1) of the Telecommunications Act:

A license may be granted –

- a) by the Minister after consultation with the Director; or
- b) with the consent of, or in accordance with a general authorization given by the Minister, by the Director for the running of any such telecommunications system as is specified in the license or is of a description so specified.

In other words the law provides for the Minister responsible for telecommunications to execute the functions of the Director. Some of the other functions of the office of the Director of Telecommunications, as outlined by the Telecommunications Act are:

- 1) Collects information regarding the activities of local telecommunications service providers

Appendix 3. Survey Instrument

INFORMATION FOR RESPONDENTS

- 1) The following dimensions of the TRE were adopted from the WTO reference paper on basic telecommunications and the “Regulation and Investment: Sri Lanka Case Study”, (Rohan Samarajiva et al.). The respondent can use the following issues to inform his/her response.

Dimension	Issues for consideration
1. Regulation of anti-competitive practices	Anti-competitive cross subsidisation, using information obtained from competitors with anti-competitive results, predatory pricing, cross subsidisation, technical disruption of interconnection, refusal to deal etc.
2. Inter-connection	Interconnection with a major operator should be ensured at any technically feasible point in the network, quality of interconnection comparable to own like services offered, reasonable charges for interconnection rates, interconnection rates unbundled, sharing of incoming and outgoing IDD revenue etc.
3. Universal Service	Maintaining of obligations relating to the universal provision of telecommunication services in keeping with the definitions of such services as initially specified by the provider.
4. Market Entry	Transparency of licensing; applicants should know the terms, conditions, criteria and length of time needed to reach a decision on their application, license conditions, exclusivity issues etc.
5. Tariff Regulation	Regulation of tariffs charged from consumers.
6. Access to Scarce Resources	Timely transparent and non-discriminatory access to spectrum allocation, numbering and rights of way; frequency allocation, telephone number allocation, site rights etc.

- 2) Brief highlights on the periods under consideration can be found at the bottom of the tables for the fixed and mobile sectors. The highlights are intended to take the respondent back to the period under consideration.

QUESTIONNAIRE

Using the following scale, fill up the following tables by ticking the appropriate box to indicate your perception of the dimensions of Guyana's TRE.

Scale: (1) – Poor (2) – Unsatisfactory (3) – Neutral (4) – Satisfactory (5) – Excellent

FIXED SECTOR							
Dimensions	Period	1	2	3	4	5	Comments on Dimensions
Universal Service	1990-1998						
	1999- present						
Tariff Regulation	1990-1998						
	1999- present						
General Comments							

Any comments you wish to make can be made in the spaces provided.

Periods under consideration

1990-1998:

1. The Guyana Telephone Corporation (GTC) was privatised thus marking the advent of the Guyana Telephone and Telegraph Company (GT&T).
2. The Public Utilities Commission and Telecommunications Bills passed.

1999-present:

1. The Public Utilities Commission Act amended.
2. Landline rates significantly increased for inter-exchange calls.

MOBILE SECTOR							
Dimensions	Period	1	2	3	4	5	Comments on Dimensions
Market Entry	1996-2000						
	2001- present						
Access to Scarce Resources	1996-2000						
	2001- present						
Inter-connection	1996-2000						
	2001- present						
Tariff Regulation	1996-2000						
	2001- present						
Regulation of anti-competitive Practices	1996-2000						
	2001- present						
General Comments							

Periods under consideration

1996-2000: Mobile sector becomes competitive with the granting of a license to Caribbean Telecommunications Ltd., a mobile operator in Berbice.

2001-present: Cel*Star Inc. was given a license to operate.

Annex 4. List of Respondents

1. Dr. Mark Bynoe
Director, Environmental Studies Unit
University of Guyana
2. Mr. Pat Dial
Chairman Advisory Committee on Broadcasting
& President Guyana Consumers Association
3. Mr. Gene Evelyn
Director, rate making
GT&T
4. Christopher Ram
Chartered Accountant & Business Analyst
Ram & McRae Chartered Accountants
5. Mr. Valmikki Singh
Chief Executive Officer
National Frequency Management Unit
6. Professor Clive Thomas
Director, Institute of Development Studies
University of Guyana
7. Mr. Michael Welch
Former Deputy General Manager GT&T

Foundation Partners



International Development Research Centre
<www.idrc.ca>

Canada's International Development Research Centre (IDRC) is one of the world's leading institutions in the generation and application of new knowledge to meet the challenges facing developing countries.

IDRC funds applied research by researchers from developing countries on the problems they identify as crucial to their communities. It also provides technical support to those researchers. IDRC builds local capacity in developing countries to undertake research and create innovations, believing that people from developing countries must take the lead in producing and applying

knowledge for the benefit of their own communities. IDRC also fosters alliances and knowledge sharing between scientific, academic, and development communities in Canada and developing countries.

The mission of IDRC remains "Empowerment through Knowledge," i.e. to promote interaction, and foster a spirit of cooperation and mutual learning within and among social groups, nations and societies through the creation, and adaptation of the knowledge that the people of developing countries judge to be of greatest relevance to their own prosperity, security and equity.



<www.infodev.org>

infoDev is a consortium of public bilateral and multilateral development agencies, working in close cooperation with partners from civil society and the private sector, and assisted by an expert secretariat housed at the World Bank. Its mission is to help developing countries and their international partners use information and communication technologies (ICTs) broadly and effectively as

tools of poverty reduction, sustainable economic growth, and empowerment of individuals and communities. Its work is rooted in the conviction that information and communication are indispensable elements of effective and responsive institutions (including governments), markets and societies.



<www.lirne.net>

LIRNE.NET is a strategic collaboration between researchers and faculty from: the **Center for Information and Communication Technologies (CICT)**, Technical University of Denmark; **DIRSI – the Regional Dialogue on the Information Society**, Latin America and the Caribbean; **Economics of Infrastructures (EI)**, Delft University of Technology, the Netherlands; **LINK Centre**, University of Witwatersrand, South Africa; **LIRNEasia**, Sri Lanka; **Media and Communications Department (media@LSE)**, London School of Economics, UK; and **Fundación Comunica**, Uruguay.

The LIRNE.NET mission is twofold:

- To facilitate ICT-related institutional reform throughout the world – through research, training, dialogue, policy and regulatory advice; and to build human capital in this new area as the foundation for effective policy, regulation, governance, management and development in new 'network' or 'knowledge' economies.

LIRNE.NET activities include:

- External Training Initiatives (for government, industry and NGOs); Research Activities and Reports; World Dialogue on Regulation for Network Economies <regulateonline.org> and Expert Analysis & Commentary on Current Issues.

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ANDREW J BARENDSE (PhD) has 20 years professional experience in the management of the telecom sector. He spent 15 of those years as a practitioner for a large telecom operator and the last five years as a Research Fellow and Assistant Professor at Delft University of Technology where his ongoing work addresses international telecom, policy, regulation and the strategic behavior of firms. In industry he has worked in regulatory affairs (as a senior manager), sales (as a sales account manager), corporate training and development (as a lecturer) and network operations (as a planning officer).

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