

ICT Policy Reform and Rural Communications Infrastructure

- Bridging Digital Divide through Private Sector Development -

情報通信セクター政策改革と 地方通信インフラ

—国際ICT政策研究セミナー報告書—



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Institute for International Cooperation
Japan International Cooperation Agency

独立行政法人国際協力機構
国際協力総合研修所

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This report is a summary of the views of the presenters at the International Seminar on ICT Policy Reform and Rural Communication Infrastructure and does not necessarily reflect the official views of the Japan International Cooperation Agency

本報告書の内容は、国際ICT政策セミナー「情報通信セクター政策改革と地方通信インフラ」における発表者の見解を取りまとめたもので、必ずしも独立行政法人国際協力機構の統一的な公式見解ではありません。

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Foreword

Since the Government of Japan launched “Okinawa IT Initiative” at the G8 Summit in Kyushu-Okinawa 2001, Japan’s support to the Information, Communication Technology (ICT) has been gathering attention from all over the world. In the developed economies, ICT has been regarded as the catalyst for productivity improvement and then the engine for economic growth. ICT contributes to the economic growth and the improvement of quality and access of public service delivery. However, in the developing countries, in the remote areas, in particular, where there is only limited access to ICT, *Digital Divide* - the gap in terms of the accessibility to information - has been preventing the economic growth from taking place so easily.

The first step to cope with the *Digital Divide* is the development of communication infrastructure in the poor rural areas where the local population has been most severely affected by the lack of information access. But the non-existence of the more urgent and larger-scale rural infrastructure, e.g. roads, bridges, drinking water supply and electricity, matched with the constraints in the public spending, has been making it difficult to cover all the rural infrastructures development with the government budget. Also, the innovation in the mobile network has been much more rapid than that in the fixed phone, which has made it easier for the private telecom operators to enter into the competitive market environment, without making a huge capital investment in the network utilities. Therefore, the public expenditure for the rural fixed phone network has been losing its ground. The challenge for rural infrastructure is therefore the policy and institutional reform that enables private operators to participate. The way the ODA fund is used, therefore, needs to be shifted from financing the capital investment to the improvement in investment climate that attracts more private operators, through the policy reform and institutional development.

The seminar on ICT policy reform and rural communication infrastructure was initiated at the European Bank for Reconstruction and Development (EBRD), as a

序文

2001年の九州・沖縄サミットで「沖縄 IT イニシアチブ」を打ち出して以来、我が国の情報通信技術 (ICT) 分野における支援は国際社会から注目を集めています。先進国では、ICT は生産性向上の媒体となる他、経済成長の牽引役であると見られてきました。ICT は経済成長に貢献し、公共サービス提供の質的向上や面的拡大にも繋がっています。しかし、途上国、特に遠隔地においては、ICT に対するアクセス機会が限られており、情報へのアクセスの難易度に大きなギャップ、即ちデジタル・ディバイド状況が存在します。このことは、経済成長の実現が容易ではないことを示しています。

デジタル・ディバイド状況の克服に向けた第一歩は、情報へのアクセスの欠如により地域住民が最も深刻な影響を受けている農村貧困地域で通信インフラを整備することです。しかし、道路や橋梁、上水道、電力といったより緊急性が高くて資本投資の規模が大きい村落インフラの欠如は、途上国の財政上の制約とあいまって、政府予算のみで全ての村落インフラを整備することを困難にしています。さらに、移動体通信ネットワークにおける技術革新は、固定電話に比べてはるかに急速で、民間の通信事業者が、ネットワークへの巨額の資本投資を行わずとも競争的な市場環境の下で参入してくることが容易になってきています。このため、農村部の固定電話網への公共支出は根拠を失いつつあります。村落インフラの課題は、民間事業者の参入を可能にする政策や制度の改革にあります。従って、ODA 資金の活用法についても、投資資金の融通ではなく、政策改革や制度構築を通じて民間事業者を惹きつける投資環境の改善へとシフトすることが必要です。

ICT 政策改革と地方通信インフラに関するセミナーは、欧州復興開発銀行 (EBRD) が民間投資をもっと動員するための政策研究の一環として発案したものです。JICA は、カナダの IDRC や慶應義塾大学湘南藤沢キャンパス (SFC) とともに本セミナー

part of policy research to mobilize more private investment. Then, JICA was invited as well as IDRC and Keio University-Shonan Fujisawa Campus. The seminar was held from August 23 to September 1, 2004, mainly at Keio University-SFC, with the participation of the prominent ICT policy researchers from the world and the officials of the telecom regulatory authorities from the Central Asia and Caucasus. This eight-day seminar has also given a lot of insights on the JICA's approaches to the telecommunications sector reform in developing countries.

This report is mainly prepared by the EBRD, with some revision added by the Institute for International Cooperation (IFIC), JICA. The original idea was to come up with e-learning tools both in English and Russian, but we believe it will also be a useful reading material for the staff of JICA HQs and country offices who are involved in the policy dialogues in the ICT and telecommunications sector. Because the current donors' support to the sector is not focusing on funding, but on sector reform, this report will give the readers a good theoretical background for the on-going reform discussions at the country level.

We regard this seminar as a complement to IFIC's diagnostic study on Public-Private Partnerships (PPPs), which will be completed in April 2005. Although the PPP diagnostic study report is available only in Japanese, we expect it to be a good introduction to the JICA staff on the private participation in infrastructure development.

We are very grateful to the invitation from EBRD, initiated by Mr. Motoo Kusakabe, Senior Counselor to President, who has also contributed to the drafting of the report. Also, we appreciate the coordination by Prof. Iwao Kaneyasu of Keio University-SFC. The seminar would not have been carried out successfully without the devotion of the two. Finally, we are thankful for the active participation from across the world.

Toru Taguchi
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March 31, 2005

の共催者に名を連ねました。2004年8月23日から9月1日まで、主に慶應SFCを会場として開催され、世界的に著名なICT政策研究者や中央アジア・コーカサス地域の通信事業規制当局者などが招聘されました。8日間にも及ぶこのセミナーは、途上国の通信セクター改革に向けたJICAのアプローチを検討する際に私達に必要な多くの新鮮な視点を与えるものでした。

この報告書は主にEBRDが準備し、国際協力総合研修所が若干の加筆と修正を加えたものです。当初の考えは英語とロシア語のE-ラーニング教材を制作することでしたが、私達はこの報告書がJICA本部や各国事務所の職員が通信政策分野における政策対話に関わる場合に有用な読本でもあるということを確認しております。現在、多くの援助機関の通信セクター向け支援は資金供与ではなくセクター改革に集まっています。本書は、各国において進められている改革論議に理論的な背景を与えることでしよう。

私達は、本セミナーを、国総研が実施した官民パートナーシップ（PPP）基礎研究を補完する位置付けであるととらえています。PPPの基礎研究報告書は日本語版しかありませんが、同報告書が民活インフラについてJICA職員が理解を深めるための格好の入門書になるものと考えます。

本報告書の取りまとめに当たっては、EBRD 総裁付上級顧問である日下部元雄氏がイニシアチブをとられました。また、セミナーの準備と実施に当たり、慶應大学SFCの金安岩男教授に調整の労をお取りいただきました。お二人の献身的な取り組みなくして、セミナー自体が実施に至らなかったものと考えます。最後に、世界中から積極的に参加した皆様に対し、この場を借りて御礼を申し上げます。

2005年3月31日
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国際 ICT 政策セミナー
「情報通信セクター改革と地方通信インフラストラクチャー」
－中央アジア・コーカサス地域の発展を中心に－
概 要

2004年8月23日から9月1日にかけて、慶應大学湘南藤沢キャンパスをメイン会場として、国際 ICT 政策セミナー「情報通信セクター改革と地方通信インフラストラクチャー」が開催された。本セミナーは JICA、欧州復興開発銀行（EBRD）、IDRC（カナダ）及び慶應義塾大学の共催により、中央アジア・コーカサス地域 5ヶ国の規制当局代表者と世界各国の情報通信分野の政策担当者、規制当局、政策研究者、他援助機関等から招聘した延べ約 50名と、国内から募った延べ約 50名の参加によって開催された。

日程：2004年8月23日（月）から9月1日（水）まで 場所：慶應義塾大学湘南藤沢キャンパス（SFC）、三田キャンパス（8月27、28日のみ） 主催：欧州復興開発銀行（EBRD）、独立行政法人国際開発機構（JICA）、慶應義塾大学 SFC、 カナダ国際開発研究センター（IDRC） 共催：横須賀市、横須賀リサーチパーク、神奈川サイエンスパーク 協賛：世界銀行、国際農業開発基金（IFAD）

1. ICT 分野における国際社会の動向

情報通信技術（以下、ICT）は、知識集約型の成長を創出し、地域における雇用の創出・知識・情報へのアクセスを可能にするといった点において、先進国・途上国の双方にとって不可欠である。2003年12月にジュネーブで行なわれた世界情報社会サミットにおいても、2006年に向けて、先進国と途上国が共同してデジタル・ディバイド解消のための具体的な行動を取ることを求めている。

しかし、多くの途上国では、このような ICT へのアクセスを可能とするための通信インフラの整備が著しく立ち遅れており、整備に必要な財政負担にも厳しく制約がある。アクセス改善への第一歩は、通信セクターの規制緩和、ユニバーサル・アクセス・ファンド（以下、UAF）の導入などの具体的な政策改革を進め、民間資金を活用した通信インフラの整備を可能とすることである。また、この通信情報インフラを地域社会の振興と雇用の拡大、競争力の強化に結びつけるためには、大学と起業家を核としてイノベーションを生み出す知的産業のクラスターを形成するための総合的な地域開発戦略も必要となる。

援助機関の間では、このような民間参加によるインフラ整備、総合的な ICT 政策の確立などに向け様々な取組みが行なわれている。例えば、ADB や EBRD では、アジア諸国や移行国に対して通信の自由化、民営化、独立規制機関の設立等に向けた資金援助・知的支援を行なっている。また IDRC は、これまでの通信規制緩和の経験を整理し、どのような順序での改革が最も効率的であったかといった政策研究を積極的に行なっている。加えて、多くの機関では、民間参加によるユニバーサル・アクセスの実現に向けた手法の研究が進んでいる。一方、大学における ICT の政策教育や起業家などの能力向上も途上国のデジタル・ディバイド解消のためには重要と考えられている。

2. セミナーの概要

本セミナーは、2004年4月にEBRD理事会で承認された「早期移行国イニシアチブ(Early Transition Country Initiative)」と連携し、中央アジア・コーカサス地域の最貧困国において民間セクターの投資活動を活性化するのに必要な通信セクター改革を早期実現するため、これら地域から政策立案者を招聘し、既に通信セクター改革の先行事例を持つ国の政策立案者、研究者と、ナレッジ共有型のワークショップを実施するものであった。セミナーでは、民間参入によって通信インフラの整備を進め、国・地方自治体がICTの導入によって知的産業の集積を図るための総合的な政策作りを行なうための鍵として、以下の4つの課題を設定した。

(1) 経済活動の自由化とそれを支える規制枠組み

ICTと経済成長の相関関係を詳しく見ると、電話加入率やパソコン普及率、インターネット利用率といった指標は必ずしも経済成長と高い相関関係にあるわけではない。成長の背景にあるより重要な要素は、GDPに占める海外直接投資の割合などに代表される投資環境や、公的セクターのガバナンスや企業統治、金融セクターの発展などであると考えられる。従って、ICT開発では、民間セクターの活動を支えるメカニズム、例えば、効率的で透明性が高い規制枠組みやICTを活用した広範なビジネス機会の創出、イノベーションや企業家精神を育む環境、企業家を支援する金融や社会インフラが前提として必要となってくる。このような投資環境整備の重要性は、『世界開発報告 2005』でも指摘されたところであり、本セミナーでも、民間活力の導入を可能とするための政策改革につき、各国のベスト・プラクティスと課題を共有し、参加者間での意見交換を行なった。具体的には、途上国の政策担当者が、世界銀行が開発したICT政策アセスメント・ツールを活用し、それぞれの国の通信自由化政策の現状評価を試みた。次に、各国の実情を踏まえて、ICT政策・通信サービス規制緩和への次のステップを具体的に提案する行動計画を作成した。

1 社独占の産業構造が一般的であった通信セクターにおいて、ネットワークをアンバンドル化して部分的な競争導入を行なう場合、ボトルネック保有企業と新規参入企業との相互接続が重要になる。しかし、自由競争の下では相互接続が自然に実現するとか必ずしも限らない。アンバンドル化が産業全体の効率を引き上げるためには、相互接続において新規参入企業が不利益を被らないようなルールの設定と監視を行なう規制機関の役割が競争導入と同様に強く求められる。

(2) ユニバーサル・アクセス

セミナーでは、特に、地方の通信インフラの整備に向けたUAFという新しい通信政策上の仕組みの導入と活用について討議を行なった。遠隔地域における通信事業は、民間企業がいかに効率的経営を行なったとしても不採算に陥る可能性が高く、民活によるインフラ整備を進めるには、事業立ち上げ後の一定期間、事業リスクを公的に補償する仕組みが必要との見解が援助機関の間では強まっている。UAFは、通信事業者の売上高の3%程度、或いは事業免許料を基金として積み上げ、これを不採算地域における事業者に対する活動助成に充当する仕組みである。本セミナーでは、ペルー、チリ、スリランカ、ウガンダ等、UAF導入実績のある途上国とUAFに関する政策研究で先行する先進国から講師を招き、UAFに対する理解を図った。

UAFは採算地域の事業収入によって不採算地域へのサービス拡大を支援する仕組みで

あるが、途上国の場合は UAF の積み立てには不足が生じることが懸念される。このため、多くの援助機関では、援助による UAF 支援が必要との見解を持っている。また、UAF によって民間助成を行なう場合にも、Value for Money を最大化するには複数事業者間での競争導入が図られ、所定の成果を得るのに最低限の補助金で事業運営を行なうことのできる通信事業者に事業権を付与することが必要である。そのための仕組みとして、”Smart Subsidy”と呼ばれるスキームの研究が国際機関を中心に進んでおり、実際の導入事例の紹介がセミナーでは行なわれた。

(3) テレセンター

所得水準が低い途上国・地域、特に遠隔地域においては、民間事業者による通信網の整備だけでは各家庭がこれらのサービスにアクセスすることは出来ず、公共性の強い情報アクセスの「場」が必要となる。多くの潜在的利用者にとって、自宅に電話を引くために必要な加入料や基本料金の負担は非常に大きく、公衆電話やプリペイド式携帯電話のように必要な時に必要なだけ利用できればよい。このため、”Information Kiosk”、”Rural IT Center”、”Rural Telecenter”などと呼ばれる、情報通信端末を設置して利用者から使用の度に利用料を徴収する、いわゆる「テレセンター」が開設されるケースが増えてきている。テレセンターの中には、政府・ドナーが主導して整備されたものだけではなく、インドのサイバーカフェやバングラデシュの Grameen Phone のように、民間のイニシアチブにより開設され民間資金のみで運営されてきたものもある。これまでの途上国の経験では、採算上民間による運営が困難な地域へのテレセンター整備の拡大は政府・ドナーの無償資金援助に依存し、持続的運営が可能なテレセンターを全ての村に建設することができなかった。本セミナーでは、地域社会へのサービスの提供、参加型のローカルコンテンツ制作などにより、地域起業家が参加できるモデル、学校などの公共機関・NPO が運営するモデルなど幾つかの持続可能なビジネスモデルが紹介された。これらの活動も、UAF による支援の対象に含めることにより民間の活力を最大限利用した建設が可能となる。

(4) ICT クラスターの育成

産業クラスターとは、高い先端技術を持った中小企業とそれを支えるベンチャー・キャピタル、大学、研究機関などの経済的・社会的インフラが人間的な交流が可能な比較的近い距離に集まり、相互に密度の高い相互関係を形成する地域を指す。シリコン・バレー、バンガロールなど、それぞれが特徴あるクラスターを形成してきた。高度な知的集約産業を育てるためには、このような ICT 分野での産業クラスターの形成が必要不可欠であると考えられる。本セミナーでは、マンチェスター（英国）、北九州、イスラエル、新竹（台湾）における ICT 産業クラスター形成の先行経験を紹介し、大学、自治体、NPO、起業家支援組織などの役割を分析し、地域特性に合ったクラスター形成のための環境作りをいかに行なうのかを討議した。具体的には、大学の技術移転・起業家育成のための役割、ベンチャー・ファイナンスの方法、サイエンスパークの成功の条件などにつき討議を行なった。

3. セミナーの成果と今後の課題

各国事例の紹介、先行事例の研究を通じ、途上国の情報通信セクター改革へのアプローチとして、①競争促進策導入と独立規制当局の役割強化、②UAF のような地方通信インフラ整備助成制度の導入、③テレセンターの設置拡大、を重視するとのコンセンサスが形成された。中央アジア・コーカサス地域では、大手通信事業者に新興事業者への相互接続を

義務付け、通信料金の設定に関する独立規制当局の役割は法整備がかなり進んでいる。しかし、政治や政府からの独立性が高い規制当局は創設後日が浅く、職員自身が何をどうやればよいのか必ずしも十分理解して活動が行なわれているわけではないという問題点の指摘があった。UAFについては、キルギスが既に試行導入を開始しており、本セミナー参加国の代表者からも同様なファンドの創設に向けた検討を今後行なうとの発言が見られた。テレセンターは、キルギス、ウズベキスタン、カザフスタン、グルジアでパイロット事業が既に始まっている。しかし、いずれの国でも公的セクターによる上からの取組みに留まっているのが現状で、パイロット事業の自立発展とスケールアップをいかに達成するのかが今後の課題であるとの認識が共有された。その達成に必要な条件として、政治的リーダーシップとサポート、独立規制当局関係者から草の根の ICT リテラシーに至るまで膨大な能力開発ニーズの充足、特定セクター限定ではない包括的なアプローチ、が必要との結論であった。

ICT クラスタについては、起業家育成や専門技術開発などを通じて社会変革をもたらすエージェントとして、大学の役割が途上国においても重要であることが確認された。加えて、地域開発計画の立案に関して自治体と住民、民間企業、大学等が ICT 産業育成を通じて連携してクラスタ形成に至るシナリオの第一歩として、電子政府を通じた自治体と企業・大学・地域住民の連携を事例として取り上げ、官民パートナーシップ (PPP) による電子政府開発を通じてステークホルダー全てが恩恵を受ける Win-Win-Win 状況について理解を深めた。

セミナーではプレゼンテーションと質疑応答だけではなく、各セッションの後に中央アジア・コーカサスからの参加者に自国の状況を振り返る機会を設け、域内各国への適用可能性につき議論を深めた。加えて、参加者を3つの作業グループに分け、学習内容確認を目的としたグループセッションを毎夕1時間程度設け、「規制枠組み」「ユニバーサル・アクセス」「テレセンター」「ICT クラスタ」の4テーマに関してはセミナー後半に全体討議の時間を改めて設ける等して、学習内容の理解促進に努めた。中央アジア・コーカサス各国の情報通信規制当局関係者同士が会して意見交換を行なう機会はこれまで少なく、参加者の間では、近隣諸国の取組み状況から学んだり刺激を受けたりすることができたとセミナーを評価する声が聞かれた。また、今後の要望として、参加者間のネットワークを維持し、連絡を取り合える体制の構築が挙げられた。

8月27日には、二国間援助機関による ICT 支援の取組みを紹介するセッションを設けた。JICA 関連では社会開発部の取組みを中心に発表を行ない、人材育成重視の姿勢を強調した。とりわけ、2004年10月から技術協力プロジェクト開始予定であったキルギス IT 人材育成センターへの言及は、同地域からの参加者が具体的なイメージを持つのに大きく貢献した。多くの参加者より、規制当局者の能力向上から ICT リテラシーに至るまで、膨大な人材育成ニーズが存在するとの指摘があり、技術協力による支援の可能性は大きいと考えられる。

国際協力総合研修所・調査研究グループ
事業戦略チーム 山田浩司

セミナー日程 (Schedule)

August 23 (Mon), 2004

at Keio University, Shonan-Fujisawa Campus – ICT Seminar Room

Opening Session:

9:30-10:00am: Welcoming Remarks by Organizers

Prof. Iwao Kaneyasu, Keio University, SFC
Paul Moffatt, Counsel, Legal Transition Team, EBRD
Yasuo Matsui, Vice President, JICA

10:00-11:00am: Keynote Speech

“Towards a Ubiquitous Network Society – Issues and Future Challenges”

Hideyuki Tokuda, Dean Graduate School of Media and Governance, Keio University

Keynote Speeches:

11:15am-12:00pm: *Challenges in Creating Viable Rural Connectivity Models in Developing Countries*

Andrew Dymond, Intelcom Research & Consulting, Canada

12:00-12:45pm: *Development Strategy of ICT Infrastructure – ICT Sector of Kyrgyzstan*

Sagynbek Zarlykovich Dordoev, Executive Director, Informational Future Foundation,
Member of the President’s ICT Council, Kyrgyz Republic
Nurbek Turdukulov, Deputy Minister of Transport and Communications, Kyrgyz Republic

2:15-3:15pm: *ICT Development Strategy – Is ICT Engine of Growth?*

Motoo Kusakabe, Senior Counsellor to the President, EBRD

3:15-3:45pm: Orientation to the Group Learning, Self-introduction and Grouping

4:00-5:30pm: Group Learning (I): *Diagnosis of ICT Policy of Your Country*

-What are your country’s strengths?
-What are your country’s risks and challenges?”

August 24 (Tue), 2004

at Keio University, Shonan-Fujisawa Campus – ICT Seminar Room

Telecoms Policy Reform

9:30-10:45am:

Basic Telecom Sector Reform Issues – Competition, Tariffs & Interconnection

Hank Intven, McCarthy Tetrault LLP, Canada

Rethinking Telecom Reform Model - the Case of South Africa

Prof. Alison Gillwald, Research Director, LINK Center
Univ. of Witwatersrand, South Africa

11:00-11:30am: *Telecom Reform in Transition Economies – Progress and Challenges*

Maria Vagliasindi, Senior Economist, Office of Chief Economist, EBRD

11:30am-12:30pm: Panel Discussion: Progress in Reform and Challenges

Moderator: Prof. Alison Gillwald
Discussants: Senior Officials from Participating Countries,
Maria Vagliasindi, Hank Intven

Telecoms Policy Reform (II):

2:00-3:00pm: *Creating an Independent Regulatory Framework*

Prof. Rohan Samarajiva, Team Leader of the Public Interest Program Unit, Sri Lanka

3:00-3:30pm: *Legal Framework to Support ICT Reform*

Paul Moffatt, Counsel, Legal Transition Team, EBRD

3:30-4:00pm: *Creating Confidence in Private Investors; Concession and Project Finance*

David Cooper, Senior Banker, Telecom Informatics and Media Team, EBRD

4:00-4:15pm: Discussion

4:30-5:30pm: Group Learning (II): *Creating an Independent Regulator*

-Lessons from the past experience?

-What are the important factors for creating a credible and effective regulator?

-What are the next steps?

August 25 (Wed), 2004

at Keio University, Shonan-Fujisawa Campus – ICT Seminar Room

Universal Access Fund:

9:30-10:30am: *Universal Access Fund - How Does It Work and How to Manage It?*

Prof. Rohan Samarajiva, Team Leader of the Public Interest Program Unit, Sri Lanka

10:45-11:15am:

Least-Cost Subsidy Auctions for Universal Access Telecom Projects – A Practical Implementation Guide

Hank Intven, McCarthy Tetrault LLP, Canada

11:15-11:45am: *Rural Communications Development – Uganda Case*

Tusubira F.F., Makerere University, Uganda

11:45am-12:15pm: *Experiences in Developing Countries*

Andrew Dymond, Senior Researcher, Intelcom Research & Consulting, Canada

12:15-12:30pm: Discussion

Technology for Rural Communications

Moderator: Prof. Yoshiyasu Takefuji, Keio University, Faculty of Environmental Information

2:00-2:30pm:

Can Wireless and Powerline Communication Technologies Revolutionise Rural Communications?

Prof. Yoshiyasu Takefuji, Keio University, Faculty of Environmental Information

2:30-3:00pm: *Optimal Technologies to Connect Rural Communities*

Yasuhiko Kawasumi, ITU-D Rapporteur on "Communication for Rural & Remote Areas"

3:00-3:30pm: *Low-Cost Wireless Local Loop: Indian Rural Telecom Solution*

Prof. Ashok Jhunjunwala, Indian Institute of Technology, Madras

3:30-4:00 pm: *Is GSM Sustainable In Rural Communications In Poor Countries?*

Anders Engvall and Olof Hasselmark, Scanbi Invest, Sweden

4:00-4:15pm: Discussion

4:30-5:30pm: Group Learning (III): *Possibility of Introducing Universal Access Fund (UAF)*

-What is the prerequisite for UAF?

-How to attract investors?

-How to evaluate proposals?

**August 26 (Thu), 2004
at Keio University, Shonan-Fujisawa Campus – ICT Seminar Room**

Community Access to Communications:

9:30-10:30am: *Community Access to Communications: 10 Questions – Provisional Answers*

Dr. Michael Best, Research Scientist, MIT Media Lab., USA

Creating Multi-Purpose Telecenters

Moderator: Dr. Michael Best, Research Scientist, MIT Media Lab., USA

10:45-11:15am: *Linking Communities in the Information Society –*

Applying ICTs for Livelihood

Chetan Sharma, Founder, Datamation Foundation, India

11:15-11:45pm: *Creating Farmer's Information through Rural Connectivity*

Roxanna Samii, Web-Manager, Communication Division, IFAD

11:45am-12:15pm: *ENRAP: Strengthening Knowledge Networks for the Poor*

Shalini Kala, Coordinator, Electric Networking for Rural Asia/Pacific (ENRAP),
IFAD

12:15-12:30pm: Discussion

1:50-2:20pm: *ADB's Experience in Telecenters*

Lee Jeoung-Keun, Senior Capacity Building Specialist,
Asian Development Bank Institute

Community Telecenters: Services & Sustainable Business Model

2:20-2:50pm: *Services, Creation of Contents, Sustainability*

Colin Maclay, Harvard University, Berkman Center for Internet and Society

2:50-3:20pm: *Grameen Village Phone Lady – As Community Telecenter in Rural Bangladesh*

Ichiro Tambo, Advisor on Science and Technology, OECD

**3:30-4:00pm: *Sustainable Business Model for Rural Communication Centers:
Central American Case***

Prof. Alex Sandy Pentland, Massachusetts Institute of Technology,
Digital Nations Consortium

4:00-4:30pm: *Sustainable Models for Tele-Medicine and Other Social Services*

Prof. Ashok Jhunjunwala, Indian Institute of Technology, Madras

4:30-5:30pm: *Group Learning (IV): Strategy for Creating Community Access and Services*

-What type of public access point is most effective in your country?

-What kind of service is most needed in rural communities?

-How to ensure sustainability?

**August 27 (Fri), 2004,
at Keio University, Mita Campus, Tokyo – Conference Hall (North Bldg. 2nd Floor)**

Rural Telecom Infrastructure Open Forum

9:00-9:50am: Opening Remarks:

Moderator: Ichiro Tambo, Advisor on Science and Technology, OECD

Welcome Address

Kiyoto Ido, Director General, Foreign Bureau, Ministry of Finance

ICT Policy in Japan and Asia Broadband Program

Yoichi Iida, Director for International Cooperation Div., International Affairs Dept.,
Telecommunications Bureau, Ministry of Public Management, Home Affairs, Posts
and Telecommunications (MPHPT)

9:50-11:10am:

Thematic Group Discussions (Telecoms Reform in Central Asia, Universal Access Fund):

Moderator: Maria Vagliasindi, Senior Economist, Office of Chief Economist, EBRD

Commentator: Andrew Dymond, Intelcom Research & Consulting, Canada

Hank Intven, McCarthy Tetrault LLP, Canada

10:40-11:10am: Discussion

Country Presentations:

Moderator: Prof. Rohan Samarajiva

Commentator: Paul Moffatt, Counsel, Legal Transition Team, EBRD

11:30am-12:00pm: *Communication Infrastructure Strategy in Kazakhstan*

Presentation by Kazakhstan Team:

12:00-12:30pm: *Communication Infrastructure Strategy in Kyrgyz Republic*

Presentation by Kyrgyz Republic Team

12:30-1:00pm: Discussion

Bilateral Agencies' Support for ICT

Moderator: Osamu Makino, Senior Advisor (Telecommunications), JICA

Commentator: Prof. Toshio Kosuge, University of Electro-Communications, Faculty of Communications

2:00-2:30pm: *Overview on the ICT Development Assistance by JICA*

Kenji Tobita, Team Leader, ICT Team, Social Development Department, JICA

2:30-3:00pm: *JBIC's Contribution to ICT Sector – Focusing on ODA Loans*

Junichi Yamada, Deputy Director General, International Development Finance Department, JBIC

3:00-3:15pm: Q&A

3:30-4:00pm: *Information to Knowledge – Knowledge Creation and JICA's ICT Support*

Yoshio Niizeki, Senior Advisor (Knowledge Management), JICA

4:00-4:30pm: *JICA's Experience in Telecentre Development*

-Regional Internet Centers in Malaysia

Masatoshi Akagawa, Project Leader, Nippon Koei Co. Ltd.

4:30-5:00pm: *Rural Communications Engineering Course and E-Learning Tool*

Takuzo Fujii, Hitachi Kokusai Electric, Inc, Hamura Factory

5:00-5:30pm: Q&A, Discussion

August 28 (Sat), 2004,

at Keio University, Mita Campus, Tokyo – G-SEC (East Bldg. 6th Floor)

9:00-9:45am: Thematic Group Presentations on Community Telecenters

Moderator: Motoo Kusakabe, Senior Counsellor to the President, EBRD

Commentator: Nagy Hanna, Senior Advisor, Information Solution Group, World Bank
Presentation by Thematic Group

9:30-9:45am: Discussion

9:45-11:20am: Country Presentations (Tajikistan, Uzbekistan, Georgia)

Moderator: David Cooper, Senior Banker, EBRD

Commentator: Tadao Takahashi, Former Head, Information Society Program, Brazil

Presentation by Tajikistan Team:

Presentation by Uzbekistan Team:

Presentation by Georgian Team

11:40am-12:20pm: Thematic Group Presentation on Independent Regulator

Moderator: Paul Moffat, Counsel, Legal Transition, Telecoms, EBRD
Presentation by Thematic Group (Ana Nakashidze)

Multilateral Development Banks' Support for ICT

Moderator: Motoo Kusakabe, Senior Counsellor to the President, EBRD

12:20-12:50pm: World Bank's E-Development Strategy

Nagy Hanna, Senior Advisor, Information Solution Group, World Bank

12:50-1:10pm: EBRD's Assistance for Rural Communication Infrastructure

David Cooper, Senior Banker, Telecom Informatics and Media Team, EBRD

1:10-1:20pm: Closing Remarks

Zembei Mizoguchi, President, Japan Center for International Finance (JCIF), Former Vice-Minister of Finance, Government of Japan

August 30 (Mon), 2004

at Keio University, Shonan-Fujisawa Campus – ICT Seminar Room

ICT and Knowledge-Based Growth: Keynote Speeches:

9:30-10:45am: Innovation, Knowledge Networks and Regional Development

Prof. Junjiro Takahashi, Professor Emeritus, Former Vice President of Keio University, President, Academy Hills

11:00am-12:45pm: University as the Center for Innovation and Entrepreneurship

Moderator: Prof. Junjiro Takahashi, Keio University

Prof. Tadao Takahashi, Former Head, Information Society Program, Brazil

Prof. Jamilur Reza Choudhury, Vice Chancellor, BRAC University, Bangladesh

Stuart Gannes, Director of Digital Vision Fellowship Program, Stanford University

Creating ICT Clusters of Innovative Small Businesses

Moderator: Prof. Daniel Rouach, ESCP-EAO

2:15-2:45pm: Success Factors for Regional Clustering and SME Development

Prof. Jay Mitra, Essex University, Entrepreneurship and Innovation

2:45-3:15pm: Regional Strategies to Create Technology Clusters

Prof. Daniel Rouach, ESCP-EAP (European School of Management)

3:15-3:45pm: Experience in Creating a Cambridge Cluster

Dr. Shai Vyakarnam, Director, Centre for Entrepreneurial Learning, Judge Institute of Management Studies, Cambridge University

3:45-4:15pm: Discussion

4:30-5:30pm: Group Learning (V): Strategy for Creating Regional ICT Clusters

-How to Create a Business Environment to Encourage Entrepreneurs?

-What is the Role of Universities in Incubating Entrepreneurs?

-What is the Niche for High-Tech SMEs?

August 31 (Tue), 2004

at Yokosuka Research Park & Well-City Shimin Plaza (Yokosuka Sta.)

Developing Science Parks:

10:00am-12:00: Site Visit to Yokosuka Research Park

**How to Create an Information Society in Municipal Level?
at Well-City Shimin Plaza (Yokosuka)**

1:40-1:45pm: Opening Remarks

Ryoichi Kabaya, Deputy Mayor of Yokosuka City

1:45-2:30pm: Keynote Speech

Satomi Hirokawa, Director, Department of Planning and Coordination, Yokosuka City

2:45-4:00pm: Group Learning (VI)

Moderator: Prof. Iwao Kaneyasu, Keio University, Faculty of Environmental Information

Group 1

Coordinator: Jay Mitra

Resource Person: Mikio Ihori, Director, Department of Information System, Ichikawa City

Group 2

Coordinator: Jamilur Reza Choudhury

Resource Person: Shoji Goto, Director, Citizen Service, Mitaka City

Group 3

Coordinator: Daniel Roach

Resource Person: Satomi Hirokawa, Director, Dept. of Planning and Coordination, Yokosuka City

Group 4

Coordinator: Tadao Takahashi

Resource Person: Mr. Takashi Kobayashi, Lecturer, Tokai University

4:15-5:15pm: Learning Group Presentations and Discussion

<p>September 1 (Wed), 2004 at Kanagawa Science Park</p>
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Entrepreneurship and Science Park Development

9:30-10:15am: Thematic Group Discussion on ICT Cluster

Moderator: Nagy Hanna, Senior Advisor, Information Solution Group, World Bank

Technology Transfer, Incubation, Science Parks, and Entrepreneurship Education

Moderator: Prof. Jay Mitra, Essex University

**10:15-10:45am: *The Role of Entrepreneurs and the Entrepreneurship
in Underdeveloped Areas***

Prof. Yoshiyuki Okamoto, Hosei University

10:45-11:15am: *Semiconductor Cluster Formation in Fukuoka:*

DBJ-SPRIE Japanese High-Tech Cluster Survey

Yasuhisa Yamaguchi, Chief Representative, Oita Representative Office, Development Bank of Japan

11:30am-12:00pm: *ICT Cluster in Israel*

Prof. Daniel Rouach, European School of Management

**12:00-12:30pm: *Developing High-Tech Industry through Establishing ICT Cluster
– Case of Taiwan***

Prof. Kung Wang, National Central University, Taiwan

12:30-1:00pm: Concluding Remarks

Motoo Kusakabe, Senior Counselor to the President, EBRD

Prof. Tadao Takahashi, Former Head of Information Society Program, Brazil

Prof. Iwao Kaneyasu, Keio University – SFC

2:30-5:00pm: Kanagawa Science Park: Site Visit

英文報告書の概要と要約

* この概説は、英語版 Introduction をベースに国際協力総合研修所調査研究グループが補足説明を加え、さらに「8. 援助機関に期待される役割」を新たに書き下ろしたものです。

1. はじめに

国際協力総合研修所では、2004 年度に官民パートナーシップ (PPP) の ODA への導入に関する基礎研究を実施した。この中で、官民の役割分担は各セクターの産業構造によって大きく異なるため、今後セクター毎の PPP 導入可能性の検討が積み重ねられなければならないことが指摘された。情報通信セクターは民間事業者が公共サービス提供を行なった場合でもコストの回収が比較的容易であると見られており、水道や電力、運輸交通といった他のインフラに比べて民間参入を得やすいと考えられている。本論は、2004 年 8 月に JICA が EBRD、IDRC、慶應義塾大学と共催した国際 ICT 政策セミナー「情報通信セクター改革と地方通信インフラストラクチャー」の各セッションにおける発表内容を中心に、情報通信セクターの産業構造と技術環境、政策課題、政府と援助機関に期待される役割などにつき検討を行なったものであり、いわば上述の PPP 基礎研究の情報通信セクター版との位置付けである。

2. 国家情報通信技術開発戦略の必要性

近年、多くの国が国家情報通信技術開発戦略を公表している。その背景には、情報通信技術 (ICT) が、知識主導型成長や雇用創出を促進するとともに、先進国、途上国の双方に情報と知識へのアクセスを提供するための鍵となっているからである。

ハイテク部門に支えられた急速な輸出成長は経済成長の背景にある最も重要な要因の 1 つである。しかし、ICT と経済成長の相関関係を詳しく見てみると、単なる電話加入率やパソコン普及率、インターネット利用率といった指標は必ずしも経済成長と高い相関関係にあるわけではないことがわかる。経済成長の背後にあるより重要な要因とは、GDP に占める直接投資 (FDI) の割合に代表されるようなビジネス環境や、公的セクターのガバナンスや企業統治、金融セクターの発展などであると考えられる。加えて、教育やイノベーションの質と関連した様々な指標が、一人当たり所得水準とかなり強い相関関係にある (第 2 章「ICT と成長」参照)。こうした分析は、ICT 戦略が成功するためには、単なる通信インフラの整備とパソコン、インターネットの単なる利用だけでは十分ではないことを示している。発展が成功を収めるためには、ICT セクターの活動を支える手段やメカニズム、例えば、効率的で透明性が高い規制枠組みや ICT を活用した広範なビジネス機会の創出、イノベーションや企業家精神を育む環境、企業家を支援する金融や社会インフラなどが前提として必要になる。ICT は目的ではなく、ダイナミックで革新に溢れたビジネス環境と知識主導型経済の創造のための手段である。

ICT 開発戦略を包括的なものとするためには、次の 5 つの領域に関する取組みが求められる (第 1 章「ICT 開発戦略」参照)。本稿では、そのうち (1) から (4) を取り上げる。

- (1) 経済活動の自由化とそれを支持する規制枠組み
- (2) ユニバーサル・アクセスの達成
- (3) ICT を活用したビジネスにおける雇用の創出
- (4) イノベーションと企業家精神育成に向けた支援

(5) ICTの社会的適用

3. 規制枠組みの重要性

今日、ICT分野のイノベーションや商業的發展における主要プレーヤーは民間セクターの企業家である。しかし、ICT開発のプロセスにおいて重要な役割を果たすのは依然として政府である。政府が持つ様々な機能のうち、自由化を支援し、革新的な企業家が情報通信市場で自由に活動できるようにするための近代的で透明性の高い規制枠組みの構築は最も重要である。

途上国の経験によれば、民間化や競争導入は通信インフラへの投資を加速し、通信市場の構造を根本的に変えてしまうようなダイナミックなモバイル市場の形成にも繋がったと見られている（Vagliasindi 2004、第4章「競争促進」参照）。また、透明な規制実施体制を備えた信頼性の高い法的枠組みは、通信市場に外国投資家を誘致する唯一の持続的な手段である（Moffatt 2004、第8章「通信の法的枠組み」参照）。多くの先進国や移行国では、改革プロセスの開始時に国営の独占企業を保有していた。政策改革で重要なのは市場への競争導入や独立規制当局の創設、国営独占企業の民営化が適切な相互接続ルールの設定や料金改革とともに行なわれることである。しかし、実際にはこうした課題は複雑に関連しており、民営化が関連サービスも含めた垂直統合形態を持つ民間独占企業を生み出すだけに終わってしまうことも考えられる。このような独占企業は、競争優位性を獲得するために相互接続を忌避し、内部相互補助を用いる可能性がある。こうした行為は、規制当局と市場への新規参入者にとって非常に難しい課題を投げかける。このように、民間化や自由化を進めるにしても、その政策導入の順序やタイミング、導入形態などを十分考慮する必要があるのである（Gillwald 2004、第3章「自由化戦略」参照）。

改革プロセスにおいて生じる複雑な規制の問題を解決するには、競争の場ならしを行ない全ての市場参加者を公平に扱うことで規制枠組みへの信頼性を高めるような独立した規制当局が設立されることが多い。Samarajiva (2004) は、独立規制当局がしばしば直面する課題を列挙し、ルールに基づいた簡潔な規制モデルを構築して複雑な課題を回避するより競争的な市場構造を指向すべきであると提唱している（第5章「独立規制当局の創設」参照）。

自由化の過程において通信市場が最も頻繁に直面する課題は、相互接続ルールの設定と料金改革である。Intven (2004) は、相互接続に関するWTOのルールと、コストに基づいた料金調節や、料金設定制度の設計において事業者の生産性改善努力を引き出すためのインセンティブ付与の手法を説明している（第6章「相互接続」、第7章「料金改革」参照）。

4. 競争的な通信市場環境におけるユニバーサル・アクセスの実現方法

デジタル・ディバイド解消のためには、遠隔農村地域の住民を含めた当該国の全ての人々が負担可能（affordable）な料金で通信手段にアクセスできることが重要である。これはユニバーサル・アクセス、或いはユニバーサル・サービスと呼ばれる。ユニバーサル・アクセスの4原則として、①誰にでも、②どこでも、③負担可能な料金で、④無差別に供給することを指す。しかし、ユニバーサル・アクセス提供に必要なコストは通常遠隔地では高く、商業ベースでは採算が取れないことが多い。

規制に関する伝統的なアプローチでは、政府は国営通信企業に独占事業権を与え、それと交換にユニバーサル・アクセス供給義務を課す。しかし、国営の独占事業者にとっては、深刻な財務制約の下で遠隔地に高コストのネットワークサービスを提供するようなインセンティブが殆どないため、殆どの途上国や移行国ではユニバーサル・アクセス供給は実現していない。加えて、こうした国営独占企

業は、市場支配力を行使してインターネット接続サービスやDSL、無線事業といった新たな通信サービス分野において革新的企業の新規参入を阻止しようとする傾向がある。

通信産業では、デジタル・ディバイドを解消して産業の発展を加速するための投資ニーズは非常に旺盛である。今日、多くの国々において通信市場は自由化され、国家独占を解消して民営化が進められている。民営化された企業や民間企業は資本市場から必要資金を調達してることが比較的容易である。しかし、このような資本は商業的需要の殆どを占める都市部の活動に流入するため、農村部へのユニバーサル・アクセス拡大を実現するためには新たなメカニズムが必要と考えられる（Dymond 2004a、第9章「農村部の接続性」、第10章「ユニバーサル・サービス義務」参照）。

競争導入下においてこのような課題に対処する斬新な方策の1つは、ユニバーサル・アクセス・ファンド（Universal Access Fund: UAF）と農村部でのアクセスに関するマイナス競争入札（Negative Competitive Bidding: NCB）の導入である。政府は、既存の電話事業者の売上高の一定割合を徴収することによりUAFを創設する。また、NCBの入札プロセスを通じて、政府はこれまで通信サービスが提供されてこなかった遠隔地域にサービス提供を行なうための事業権の競争入札を実施し、事業権取得者は、事業実施のインセンティブとして、UAFから1回のみ助成金を支給される。政府は、必要助成金の金額が最も少ない応募者に事業権を付与するのである（Samarajiva 2004）。近年、UAFとNCBについては、成功例と不成功例が混在し、まだら模様の様相を呈している。チリの場合は最小助成金（Least-Cost Subsidy Auction）によるユニバーサル・アクセス達成の成功事例として見られているが、「効率性ギャップ」（産業全体の効率性を改善することによってサービス提供を拡大できる余地）を解消するため、UAF導入前にチリの規制当局が規制枠組み問題に対処していたことが大きい（Dymond & Oestmann 2003）。NCB制度がValue for Moneyの最大化に貢献するためには、競争的な環境下で多くの事業者が入札参加できることが必要である。多くの民間事業者を競争入札に惹きつけるためには、公正で専門性が高く、透明性も高い入札手続が必要となる（Intven & Howard 2004、第11章「ユニバーサル・アクセス・ファンド」、第12章「スマート助成金」参照）。

ウガンダはカナダIDRCの技術援助を受け、包括的な農村通信開発法制度の導入を行なった。その政策準備過程において、全てのステークホルダーが十分関与するよう配慮が行なわれた。現在は実施も未だ初期の段階であるが、計画段階からコミュニティが関与することにより制度の自立発展性が強調されている点で特徴的である。農村開発基金（UAF）は民間通信事業者の初期投資費用に対する一度限りの助成を行ない、リカレントコストの助成は行なわないことになっている（Tusubira 2004、第13章「ウガンダの事例」参照）。

5. 地方通信を支援するための新技術

農村部や貧しいコミュニティへの接続性（connectivity）は、デジタル・ディバイド解消に必要な不可欠である。過去の経験によれば、途上国における接続性は困難なものとなる可能性が高いと考えられている。それには幾つかの理由がある（第14章「地方接続のための技術」参照）。

- (1) 国内の基幹通信網（backbone network）整備は非常にコストがかかる。
- (2) 人口過疎地域における個々の家庭への末端接続（last one mile connection）はさらに割高である。
- (3) インターネット接続に必要な固定電話やパーソナル・コンピュータの設置コストは、貧困家庭にとって高い。
- (4) またたとえパソコンが購入できる経済力があっても、維持管理や部品供給、人材育成は遠隔地ではより難しい。

今日、途上国の最貧層にも使用料金の負担が可能な形で地方通信にユニバーサル・アクセスをもたらす可能性がある幾つかの技術的進歩が見られる。その1つはモバイル通信技術の進歩である。途上国の多くでは、モバイル通信網への加入者数は固定電話網の加入者数を既に上回っている（Dymond

2004a、第9章「地方の接続性」参照）。第三代携帯電話の通信方式として W-CDMA 方式が一般的な我が国と異なり、海外では国際電話も可能である GSM 方式が途上国でも広く普及している。経済的・地理的困難を緩和する適切なビジネス・モデルがあれば、GSM 方式は助成金による事業補助がなくとも持続可能な地方通信を可能にする潜在性があると見られている（Engval & Hasselmark 2004、第16章「セルラー電話」参照）。その他にも地上波無線技術の中には地方の音声送信やデータ送信分野で開発が進んできたものがある。Wi-Fi 技術はこの分野において広範に利用されるようになってきており、Wi-Max、Cyanopy システム、corDECT などの新技術は、事業者、許容するコストの範囲内でより長い周波数のブロードバンド通信の導入を可能にしている（Jhunjhunwala 2004）。また、Best (2004) によれば、インド・タミール・ナドゥ州における典型的な地方の環境においては、無線接続によるテレセンターが、1日当たりのサービス提供から3ドルの収入を得ることで持続性が確保されている（第15章「ワイヤレス技術」参照）。

6. 持続可能なテレセンターの創設

貧しいコミュニティでは、電話接続は全ての地域住民が受容可能な情報アクセスを約束してくれるわけではなく、電話やインターネットの接続ポイントを公共サービスとして提供する必要がある。このような接続ポイントのことを「テレセンター」と呼んでいる。通常、地元の企業家がテレセンターを管理運営しているが、彼らは、テレセンターの立ち上げに当たり、地域住民や地方通信事業者、センターのフランチャイザーと協働することが多い（第17章「テレセンターのビジネス・モデル」参照）。テレセンターのパイロット・プロジェクトでは、所有形態に多くの種類がある。フランチャイズ化した情報キオスク、サイバー・カフェ、学校拠点型テレセンターなどである。通常、これらは地元の企業家が住民組織によって管理運営されている。テレセンターで提供されるサービス・コンテンツとしては、ICT リテラシー研修や農産品の市況情報、電子医療サービス、E-ラーニング、E-コマース、電子政府といった活動が挙げられる（第18章「テレセンターのビジネス・モデル」参照）。

援助機関の無償資金援助によってファンディングが行なわれたパイオニア的テレセンター・プロジェクトでは、財務や事業の持続性の達成に失敗しているところが多い。しかし、近年、地元企業家が民間商業ベースでテレセンターを運営しているケースで成功事例が増えてきている。こうした成功事例では、初期投資に対する助成の規模に制約があったにもかかわらず成功を収めているのである。ビジネス・モデルが優れており、地域の真の需要を理解し、適切な企業家研修を受けたテレセンター管理者にリーダーシップがあれば、コミュニティのテレセンターの自立発展性は達成することができる（Mclay 2004）。コミュニティ・テレセンターは、費用対効果の高いワイヤレス技術と電子ドクターやE-ラーニングといった需要主導型のサービスの提供を組み合わせることによって、地元企業家にとって持続可能なビジネス・モデルを創出している（Jhunjhunwala 2004b、Best 2004、第19章「テレセンターの自立発展性」参照）。

技術面での進歩に加え、遠隔地農村を持続可能なビジネス・モデルと繋げる優れたパイロット事業が幾つかの国で行なわれている。モバイルを利用したシステムとしては、バングラデシュのグラミン・テレコムがビレッジ電話プログラム（Village Phone Program）を導入している。このプログラムは、マイクロファイナンスを提供し、収益力のある零細企業を創出することによって、単独では電話加入が難しい低所得水準の村落住民にモバイル通信時間を転売するというものである（Tambo 2004、第20章「ビレッジ電話プログラム」参照）。

これまで通信サービスが届かなかった村落のデジタル・ディバイド問題に効果的に対処するためには、援助機関からの無償資金がなかなか届かず、政府の財政資金投入も限られている多くの村落をいかに支援してゆくのが課題である。とりわけ設置が求められるのは持続可能なビジネス・モデルのスケールアップを支援する金融メカニズム、すなわち、テレセンターの最初のスタートアップコスト

だけを支援する 1 回限定の補助である。少なくとも、現在の運営コストをサービス料収入によって回収する計画を持つテレセンターは金融市場から資金調達ができる仕組みを作ることが必要である。ユニバーサル・アクセス政策は、このような金融メカニズムを特定し、フランチャイズ制度のようなテレセンターのサポート・ネットワークを形成することによって、テレセンターの広範にわたるキャパシティ・ビルディングのニーズに応えていくことが求められているのである（第 21 章「テレセンターの評価」参照）。

7. 企業家精神とイノベーションの促進に向けた ICT クラスターの形成

デジタル・ディバイド対策に取り組む際、ICT を活用する広範な産業が発展する必要がある。こうした産業は、通常、伝統的な大企業ではなく、革新的な技術を持った中小企業から構成される。こうした企業はしばしば小さな地域においてクラスターを形成し、密接な人的交流やネットワーク形成で裨益し、ベンチャー・キャピタル・ファンドやエンゼル・ネットワーク、インキュベーター等といった様々な企業家支援メカニズムへのアクセスによって恩恵を受けてきた。

産業クラスターは、ICT のようなハイテク産業や、地方の伝統産業の集積など、様々な形で形成されてきた。クラスターには雇用創出や潜在的な成長の可能性があり、政府は地域の産業クラスターに様々なインセンティブを与えることで発展を促すことができると考えられている（Mitra 2003、第 22 章「産業クラスター」参照）。

途上国で ICT 産業のクラスターを形成するためには、幾つかの重要な誘因が考えられる。大学や先導役となる企業の存在、ベンチャー・キャピタル、企業家精神、政府の積極的な支援策、競争力のある知的ネットワークの存在などである（Rouach 2004a、第 23 章「政府の役割」参照）。

ICT クラスターは、通常、大学の研究者や研究機関、ビジネス界の相互交流を通じて形成される。起業家は新味のある技術アプローチや研究開発の可能性を常に求めている。技術力と経営ノウハウを兼ね備えた経営陣とスタッフも必要となるだろう。このような機能は大学によってより効果的に促進されると考えられる。しかし、伝統的な大学は通常ビジネス界との交流を十分に確立しておらず、起業支援の機能を効果的に果たすだけの能力を持っていない。大学はそうした文化を変革し、イノベーションを刺激して企業家精神の発揚を促す方向に変わっていかねばならない（T. Takahashi 2004）。英国のケンブリッジ大学は、その学部や学生のためだけではなく、その立地する地域の地元企業家のために起業支援の制度インフラ、すなわち技術移転機関や地元住民に解放された起業教育、インキュベーター、ベンチャー・キャピタル・ファンドなどを形成してきた。しかし、クラスターの進化に影響を与えた最も重要な要因は企業家間のインフォーマルな人的ネットワークであった（Vyakarnam 2004、第 24 章「イノベーションの中心としての大学」参照）。

起業を行なう際、初期資本の調達が必要である。しかし、起業家が初期の困難を乗り越えて事業を成長させるには、経験豊富なアドバイザーによるメンター（顧問機能）に加えて、ビジネス・プランや様々なタイプの専門サービス——法律や会計の専門家、オフィス・スペースとロジスティクス面の支援などの面からの専門的アドバイスを必要としている。起業支援システムのネットワークを形成するためには、こうしたインキュベーターやサイエンス・パーク、エンゼル（総合ビジネス・アドバイザー・サービス）、ベンチャー・キャピタル・ファンド、様々な企業家支援ビジネスなどが形成されることが重要となってくる。それに加えて、開放的で起業とイノベーションを支援するためにリスクを積極的に取っている文化が、ビジネス・セクターや学術研究機関、市民社会の活動を通じて形成されていることも重要である（Rouach 2004a）。しかし、このような状況を途上国において作り出すことは非常に困難である。どうすれば ICT クラスター形成が可能になるのか？台湾では、先ず政府がサイエンス・パークを新竹に設置した。その上で、大学や国立研究機関がハイテク分野、特に集積回路（IC）技術の研究開発への支援を行ない、後に台湾の ICT 産業集積の基盤となる様々な企業の誕

生を促していった (Wang 2004)。イスラエルでは、ユダヤ系移民が技術インキュベーターを通じて高度のエンジニアリング技術を習得するのを政府が支援し、多くの革新的なハイテク・ビジネスの創出へと繋げるのに成功した (Rouach 2004b) (第 25 章「企業家支援」参照)

8. 援助機関に期待される役割

セミナーでは十分な考察が行なわれなかったが、以上を振り返り、外部の援助機関に期待される役割が何かについて最後に述べておきたい。

政策研究と政策助言

これまで、多くの途上国において情報通信セクター改革が実施されてきており、民間主導による地方通信インフラ整備、テレセンター開発や ICT クラスター形成が行なわれてきた。そのような事例の分析を進め、グッド/バッド・プラクティスとして途上国の政府関係者や他の援助機関、研究機関と共有していくことにより、途上国政府が検討し得る政策選択の幅を拓くことができる。そして、途上国政府がまとめる国家情報通信技術開発戦略の策定に当たっても、こうした事例分析をもとに策定プロセスに積極的に関わっていくことができる。情報通信政策では、世界銀行グループやカナダの IDRC において事例研究の相当の蓄積があるため、我が国としてもこうした先行研究を常にフォローしておく必要があるが、それに加えて、これまで我が国が二国間援助によって関わった途上国の情報通信セクター事業についてその経験を整理し、対外発信できる形でまとめておく必要もある。

人材育成

本論では、途上国の政策制度としては主流化がなされていない UAF やテレセンター、ICT クラスター開発などが積極的に論じられている。改革の方向性としては既にコンセンサスが得られている競争導入と規制の枠組み構築も加え、これからの政府には新たな政策制度の設計が強く求められており、しかも全てのステークホルダーの参加により設計が進められる必要がある。また、本論では独立性の高い規制当局の設立が提唱されているが、政治や政策当局、民間の利益団体から完全に独立した規制当局を作ることは容易ではなく、セミナー参加者の間からは、設立後間もない規制当局では職員が何を期待されているのかの理解も不十分であるとの指摘がなされている。こうした政策制度設計や実施のモニタリング、規制制度の運用といった技術能力だけでなく、顧客指向の徹底といった意識変革の問題に至るまで、人材育成ニーズは大きい。また、こうした政策・規制当局の能力だけではなく、地域においても、テレセンターの管理運営には技術者によるメンテナンス能力の強化に加え、ICT リテラシーのように受益者を対象とした教育機会の提供も必要と考えられる。

資金協力

本論からもわかる通り、不採算地域へのサービス拡大は、国営独占事業者がサービス提供しても、民間事業者が提供しても採算割れが起きる。しかし、公的セクターに比べて民間事業者の経営効率是一般に高く、民間事業者が取りづらい事業リスクの一部を公的セクターが負担することによって不採算地域でも民間参加を得てサービス提供を行なおうとするのがユニバーサル・アクセスの基本的考え方である。そして、そのための政府補助金の財源として援助資金を活用することは国際社会において近年理解が得られつつある。補助金といっても、利用者負担能力に乏しい低所得者層のみを補助対象として特定し、必要最低限の補助しか行なわないことが共通認識である。本論で紹介されている UAF が通信インフラ未整備の遠隔地域への事業拡大を支援するのであれば、いかに Value for Money を最大化する努力が払われたとしてもインフラ整備に必要な資金量は膨大で、既存の事業者からの「課税」だけではファンドの積立てが不十分であると予想される。従って、UAF の積立てには政府財政資金からの拠出か或いは援助機関からの資金拠出が必要であると考えられる。

国際協力総合研修所・調査研究グループ
事業戦略チーム 山田浩司

ICT Policy Reform and Rural Communication Infrastructure - Main Report -

Before you read...

This is a report of the International Seminar on ICT Policy Reform and Rural Communication Infrastructure. The report is divided into 25 chapters in 5 parts. Before each part, there will be a self-diagnostic tool for the telecommunication sector in your country, which is based on the one developed by the World Bank Group. Answering to the key questions by identifying the level of your country out of five, you will be assessing the status of the telecommunication sector in your country.

There will be some references to the presentations that the seminar participants made. Those presentations are available at the following JICA web sites:

URL: <http://www.jica.go.jp/english/event/index.html>

Also, the readers may wish to browse the presentations used in the seminar if they are interested. This seminar has also established its own web sites where most slides are available:

URL: <http://www.ictseminar.org>

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Introduction

Developing ICT requires various pre-conditions, which developing and transition countries often lack. They need a comprehensive strategy to address all these factors. What is the best strategy for a country to develop ICT?

Part I: Why we need a national ICT Development Strategy?

National ICT Development Strategy

Recently many countries have published national ICT development strategies. Behind such initiatives there is an increasing recognition that Information and Communication Technology (ICT) is the key enabler in promoting knowledge-based growth, job creation and providing access to information and knowledge for both developed and transition countries.

Economic Growth and ICT

Rapid export growth based on high-tech sector is one of the most important factors behind the economic growth. However, closer review of the correlations between ICT and economic growth reveals that simple telephone penetration ratio, penetration of PCs and internet users do not necessarily correlate highly with such growth. More important factors behind the growth appear to be the business environment (represented by the share of Foreign Direct Investment in GDP), public sector and corporate governance and financial sector development. In addition, various indicators related to the quality of education and innovation correlate quite highly with the relevant per capita income levels (Kusakabe 2004).

→**Chapter 2: ICT and Growth**

ICT Strategy as a Tool to Upgrade Business Environment of a Country

This analysis suggests that for the successful development of ICT strategy, simply increasing the physical telecom infrastructure or usage of PC and Internet will not suffice. Essential to successful development are the instruments and mechanisms

that underpin the workings of the ICT sector - an efficient and transparent regulatory framework, creation of broad range of ICT-enabled businesses, a conducive environment for innovation and entrepreneurship, and, financial and social infrastructure to support entrepreneurship are among the critical pre-cursors to ICT development. In essence, ICT is not an objective but a tool for creating a dynamic, innovative and upgraded business environment and knowledge economy.

What we should address in an ICT Development Strategy?

Accordingly, it is necessary to have comprehensive programs to address the following five strategic areas in an integrated strategy:

- (a) Liberalized environment and supportive Regulatory Framework
- (b) Achieving Universal Access
- (c) Creating Jobs through ICT-enabled businesses
- (d) Innovation and Entrepreneurship support
- (e) Social application of information and communication technologies

→**Chapter 1: ICT Development Strategy**

Part II: Why regulatory framework is so important?

Today, the major players within the world of ICT innovation and commercial development are private sector entrepreneurs. However, the government plays a vital role in the process of ICT development. Among other functions, adoption by government of a modern and transparent regulatory framework to support liberalisation and allow innovative entrepreneurs to work freely in the information and communication markets is a most important factor in the successful development of ICT.

Competition and privatization accelerates the investment in infrastructure

In the experience of developing and transition economies, privatization and introduction of competition has accelerated investment in telecom infrastructure and even created a dynamic mobile market which will eventually change the telecom market structure (Vagliasindi 2004).

→**Chapter 4: Promoting Competition**

Creating a credible legal framework with a transparent regulatory regime is the one of the only sustainable ways to attract foreign investors in the telecommunication market (Moffatt 2004).

→**Chapter 8: Legal Framework for Telecommunication**

Sequencing of Reform Matters

Many developed and transition countries started with a single state monopoly telecom provider at the beginning of the reform process. It is well-known that the essential components of reform are; introduction of competition to the market, creating an independent regulator, privatizing the state-owned monopoly, together with appropriate interconnection arrangements and tariff reform. However, the issues are much more complicated in the real world. Privatization can arguably create a "private monopoly", usually vertically integrated, in related services. Such an entity can delay interconnection and use cross-subsidy to gain competitive advantages. This creates difficult regulatory issues for the regulators and new entrants to the market. Accordingly, the sequencing, timing and modality of privatization and liberalization are important (Gillwald 2004).

→**Chapter 3: Liberalization Strategies**

Creating an Independent Regulator

In order to solve the complex regulatory issues that arise during the reform process independent regulators are often created to "level the playing field" and provide a fair treatment to all market participants, including newcomers and, thus, create confidence in the regulatory framework of the country. Samarajiva (2004) presents likely issues an independent regulator will face and recommends a simple rule-based regulatory model and creation of a

more competitive market structure to avoid complicated issues.

→**Chapter 5: Creating an Independent Regulator**

Internationally Endorsed Rules and Good Practices in Inter-Connection and Tariff Reform

The most frequent issues facing the telecom markets in the process of liberalization are inter-connection arrangements and tariff reform. Intven presents the WTO rules concerning interconnection and, modern practices for tariff re-balancing based on costs and providing incentives to operators to improve productivity (Intven 2004).

→**Chapter 6: Interconnection Arrangements**

→**Chapter 7: Tariff Reform**

Part III: How to achieve universal access in the competitive telecom market environment?

In order to bridge the Digital Divide, it is vital to provide affordable communication access to all the people in the country, including remote rural areas. Usually the cost of such universal access to remote areas exceeds commercial revenues.

Traditional Regulatory Approach: State Monopoly

In the traditional regulatory approach, the Government endowed monopoly status to a state-owned telecommunication company and, in exchange, require the monopoly to provide universal access. For the national monopoly telecom operator, however, there is little incentive to provide expensive network to remote areas under severe financial constraint. Thus universal access has not been achieved in most developing or transition countries. In addition, such a state monopoly often uses its market power to prevent others providing such service through blocking the entry of new innovative firms in the new communication service areas, such as Internet Service Providers, DSL and Wireless providers.

Need for Investment-Privatization

There is a strong need for investment in the communication industry to accelerate the development of communication industry to bridge the Digital Divide. Today, in increasing number of countries, the telecoms market has been liberalized and the state monopoly has been privatized. Privatized and private sector companies more easily attract necessary investment from the capital market to the communication industry. While such private enterprise can attract capital, such capital only focuses on the urban areas where most of the commercial demand exists. Accordingly a new mechanism to achieve extend such services (Universal Access) to rural areas in the context of liberalized market is necessary (Dymond 2004a).

→Chapter 9: Rural Connectivity

→Chapter 10: Universal Service Obligations

Universal Access Fund and Smart Subsidy Scheme

One innovative way to address this issue in a competitive manner is the introduction of Universal Access Fund (UAF) and Negative Competitive Bidding (NCB) for rural access. In such an approach, a government will create a Universal Access Fund, usually financed by a percentage levy on the revenues of existing telephone operators. Through the negative bidding process, the government invite private operators to bid for a license to provide service to certain remote un-served areas, providing such licensees with a one-time subsidy from the Fund as an incentive. The government selects the operator that required a minimum amount of subsidy from the government (Samarajiva 2004).

There were both success and suboptimal results with the UAF and NCB in recent years. Chile is regarded as a success case with minimum subsidy to achieve Universal Access as Chilean regulator addressed the regulatory framework to close the “efficiency gap” before the UAF operation (Dymond & Oestmann 2003).

In addition, in order to attract many private operators to the bidding, the process requires a fair, professional and transparent bidding procedure (Intven & Howard 2004)

→Chapter 11: Universal Access Fund

→Chapter 12: Smart Subsidy

Uganda’s Comprehensive Rural Connectivity Strategy through a Universal Access Fund

Uganda introduced comprehensive rural communication development legislation supported by Canada’s International Development Research Centre (IDRC) technical assistance. The policy preparation process was careful enough to involve all the stakeholders. Implementation of the strategy is still in its initial stages, emphasizing sustainability through community engagement from the planning stage. A Rural Development Fund (Universal Access Fund) will only be used for one time subsidy for initial costs and not for recurring costs. (Tsubira 2004).

→Chapter 13: Uganda’s Case

Part IV: What are the affordable new technologies to support rural communications?

Connectivity to rural areas and poorer communities are essential for bridging the Digital Divide. Past experiences show that connectivity in developing and transition countries can be difficult.

Why rural connection is so difficult?

There are a number of reasons:

- (a) The cost of installing a backbone communication network throughout the country is expensive;
- (b) The last one-mile connection to individual households in sparsely populated areas can be even more costly;
- (c) The costs of telephone handsets or PCs, in the case of Internet connection, are expensive for the poorer households;
- (d) Even if they can afford to buy PCs, maintenance, supplying parts and training people how to use them is more difficult in the remote areas.

→Chapter 14: Technologies for Rural Connectivity

New Enabling ICT Technologies

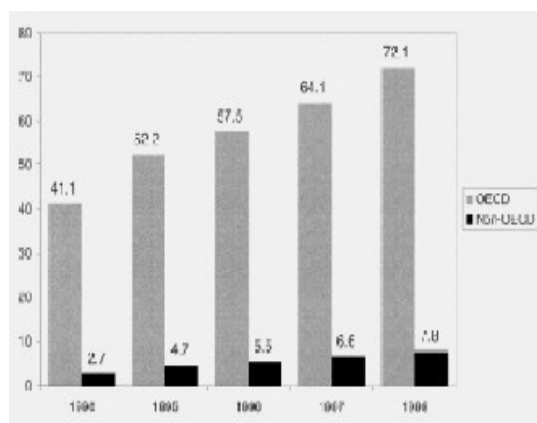
Today, there are some favourable technological developments, which can bring Universal Access within practical reach even the poorest of developing

countries: One is the progress in the mobile technology which enables more affordable rural telecoms. In many transition countries subscribers to the mobile networks exceed those to the fixed-line network. (Dymond 2004a)

→**Chapter 9: Rural Connectivity**

If equipped with suitable business models to mitigate economic and geographic difficulties, GSM mobile system may provide a sustainable rural communication solution even without subsidy (Engval & Hasselmark 2004)

→**Chapter 16: Cellular Phone**



There are other types of terrestrial wireless technologies emerging in rural voice and data transmission areas. Wi-Fi technologies have become widely used in this areas, Wi-Max, Canopy systems and corDECT, which enable operators to cope with a longer range and broader-band connection with affordable costs (Jhunjhunwala 2004). According to Best, in a typical rural environment in Tamil Nadu, India, wirelessly connected telecenters can be sustained with USD 3 revenue from their services per day (Best 2004).

→**Chapter 15: Wireless Technologies**

Part V: How to Create Sustainable Telecenters?

In the poor communities, providing telephone connections does not solve affordable communication access to all the people. There is a need for public access points for telephone and Internet. Such access points are called Telecenters. Usually local entrepreneurs are the manager of telecenters, and he works with the community, rural

telecom providers, and telecenter franchiser organizations to establish telecenters.

→**Chapter 17: Telecenter Business Models**

Social entrepreneurs are active in rural connectivity

There are many types of ownership structures in successful pilot projects; Franchised Rural Information Kiosks, Cyber Cafés and school-based telecenters. Usually these are run by local entrepreneurs or civic organizations. Services provided are a combination of ICT literacy training, market price information, e-health, e-learning, e-Commerce and e-Government activities.

→**Chapter 18: Business Models for Telecenters**

In many telecenters pioneering projects funded by donor grants, the projects failed to achieve financial and operational sustainability. However, recently, there are more successful cases where local entrepreneurs were encouraged to run the telecenters on the commercial basis with a limited amount of initial subsidies.

With a good business model, understanding of real local demand and leadership by a telecenter manager with appropriate entrepreneurial training, it is possible to achieve a sustainability of community telecenters (Mclay 2004).

Community telecenters, combining cost-effective wireless technologies with the provision of demand-driven services, such as e-doctor, e-learning, have created sustainable business models for local entrepreneurs (Jhunjhunwala 2004, Best 2004).

→**Chapter 19: Sustainability of Telecenters**

There are good initiatives in rural connectivity

In addition to technical progress, there are many good pilot projects to connect remote villages with sustainable business models. In the mobile based system, Grameen Telecom has introduced a Village Phone program to resell mobile communication time to villagers who cannot afford to buy telephones themselves through the successful creation of profitable micro-enterprises (Tambo 2004).

→**Chapter 20: Village Phone Program**

Financial Mechanisms to Scale-Up Rural Connectivity

To address the Digital Divide issues of un-served villages in an effective manner, the large numbers of villages with limited donor grants or government budget contributions need to be addressed. An efficient financial mechanism to support the scaling-up of sustainable business models with a clearly defined one-time subsidy to support the initial start-up cost of the telecenters needs to be established. Those telecenters which have a plan to recover, at least, the current operational costs with service revenues can be financed.

Universal Access policy should identify such a financing mechanism and also address the extensive capacity building needs of the telecenters by creating telecenter support networks, such as franchisors.

→**Chapter 21: Telecenter Evaluation**

Part VI: How to Create ICT Clusters to Promote Entrepreneurship and Innovation?

In bridging the Digital Divide, a broad range of ICT-enabled industries needs to be developed. These industries usually consist of small and medium-sized enterprises with innovative technologies rather than traditional large enterprises. These enterprises often form a cluster in a small region in order to enjoy close human contact and networking among themselves and to benefit from access to various entrepreneur-support mechanisms, such as venture capital funds, Angel networks, incubators, etc.

What are industrial clusters and ICT clusters?

Industrial clusters evolved in different forms: high-technology clusters, such as ICT clusters, rural and traditional industry clusters, such as Italian industrial districts. Because clusters have merits of employment creation and better growth potential, the government can provide incentives for regional industrial clusters with differing degrees (Mitra 2003).

→**Chapter 22: Industrial Clusters**

In order to create ICT clusters in emerging and developing countries, there are several important driving forces; universities, leading companies,

venture capital, entrepreneur spirit, active government support and competitive intelligence & networking (Rouach 2004a).

→**Chapter 23: Role of the Government**

Interaction Between Academia and Business

ICT clusters are usually created through the interaction of academic, research institutions and the business community. Entrepreneurs need a fresh technical approach and research and developmental capability. Also a team of management and staff with good technical and managerial skills needs to be found. Such functions are most effectively promoted by universities.

However, traditional universities usually do not have adequate interaction with business community and have little or no capacity to provide entrepreneur support functions effectively. Universities need to change their culture to stimulate innovation, and promote entrepreneurship (T. Takahashi 2004).

Cambridge University has created an institutional infrastructure to support entrepreneurship both for its faculty and students and for local entrepreneurs in the region. Infrastructure includes technology transfer organization, entrepreneurship education open to local people, incubators, and venture capital fund. However, the most important factor influencing the evolution of the cluster is informal human networks of entrepreneurs (Vyakarnam 2004).

→**Chapter 24: University as an Innovation Center**

Start-ups need funding but that is not all they need

It is clear that start-up companies require funding for initial capital. However, entrepreneurs also need an expert advice on business plan, various types of professional services, such as lawyers and accountants, office space and logistical support, together with mentoring and tutoring by experienced people to help them overcome initial difficulties. It is important that incubators, science parks, Angels, venture capital funds and various types of entrepreneur-support businesses will be created to form a network of support systems for entrepreneurs. In addition, an open and risk-taking culture to support entrepreneurship and innovation will be created in the region by the activities of business

organizations, academic institutions and civil society (Rouach 2004a).

How did emerging and developing countries create ICT clusters?

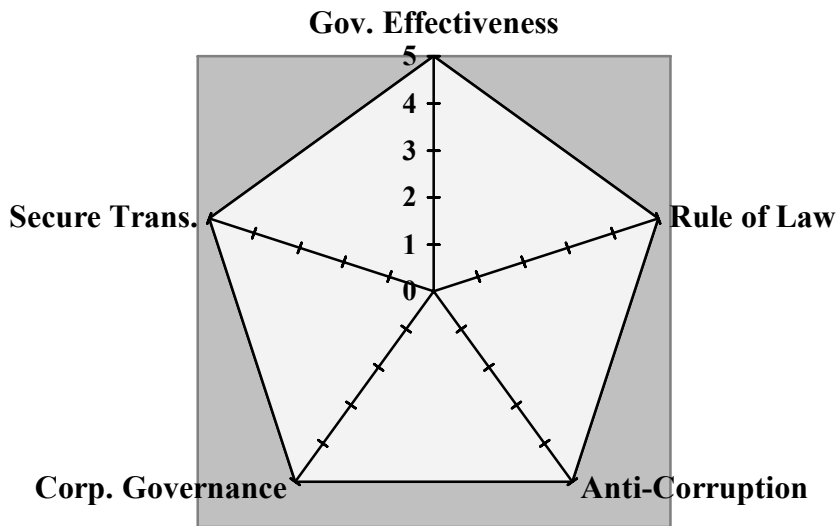
Such conditions, however, are very difficult to implement in most of the emerging and developing countries. In Taiwan, the government has created a Science park first in Hsinchu. In addition, universities

and national research institutes provided a support for R&D for high-technologies, particularly integrated circuit (IC) technologies and created a spin-off companies which formed a basis for Taiwanese ICT Cluster (Wang 2004). In Israel, the Government supported immigrants with high engineering skills through a technology incubator and created many innovative high technology businesses (Rouach 2004b).

→**Chapter 25: Supporting Entrepreneurs**

Part I ICT and Transition

Self-Diagnostic Tool for ICT Policies



E-Development Strategy Business Environment	
Question 1. Government Effectiveness	
How effective is the government functioning?	
Level 1	Government fails to stabilize the macroeconomic situation. Inflation is uncontrolled and external and budget balance shows a chronic deficit. There is a strong control of foreign exchange transactions. Import duty is high and there are many non-tariff barriers. Structural reform is very slow or non-existent.
Level 2	Government is implementing an IMF program, with some success in stabilizing the macroeconomic problems. Structural reforms, such as privatization and liberalization of prices and opening up of the economy have started.
Level 3	The government has succeeded in economic stabilization and has introduced foreign exchange convertibility. Privatization, liberalization of prices, trade and investments proceed significantly.
Level 4	The government has introduced institutional framework for banking supervision, capital market regulations, and independent regulatory bodies for public utilities.
Level 5	The government has privatized key state enterprises, and commercial banks attracting foreign strategic investors. Economic policies and management are conducive to the foreign and domestic private sector investors and entrepreneurs. Private sector is expanding rapidly.

Question 2. Rule of Law

To what extent do the government respect the rule of law?

Level 1	Organized and violent crimes are prevalent. Businesses are subject to large losses due to crimes. Tax evasions are prevalent. There is a wide-spread view that the court system is not effective and fair.
Level 2	The government introduced measures to strengthen the enforcement of the law. But the implementation efforts are weak and there is no significant impact of the measures.
Level 3	The government has introduced a commercial law, bankruptcy law, concession law, law on pledge, etc. which are harmonized with the international best practice.
Level 4	The government introduced a comprehensive reform of judiciary system, ensuring independence, integrity and accountability of judicial system. Self-governing organizations of lawyers are established and created a clear code of conduct of the judiciaries and has introduced a monitoring system.
Level 5	In addition, the government provides a training for the judges, creating special courts for bankruptcy and other complex economic cases.

Question 3. Anti-Corruption

To what extent does the government address the corruption issues?

Level 1	Government officials are generally under-paid, over-populated and productivity is considered to be low. Many government positions are allocated by connected people or even can be bought. There is no competitive performance evaluation system. Corruption is prevalent without government's effort for anti-corruption.
Level 2	Government introduced anti-corruption measures, but there is no real change in the situation of civil servants and no real impact on the level of corruption.
Level 3	The government has legislated the comprehensive legislation to combat corruption. Civil servant system is undergoing a reform, with introduction of performance evaluation, and competition and merit system. Public sector employment and promotion policies are strictly controlled by a central public service personnel administration.
Level 4	Major administrative process has been analyzed. Policies, procedures and job descriptions in all governmental agencies are clearly and transparently defined. Independent auditors are engaged in monitoring the compliance. Systematic surveys of corruption throughout the public agencies are implemented to identify where corruptions are most prevalent.
Level 5	The government introduced a systematic e-government policy, including the review of administrative processes to be more integrated, efficient, transparent and client-oriented. The process is automated and most application for registration, licence, permit are processes electronically conducted with one-stop windows without bureaucratic delays. The government productivity benchmarks are monitored regularly and disclosed to the public. Civil society is encouraged to participate in such monitoring.

Question 4. Corporate Governance

What is the level of corporate governance?

Level 1	Many companies in public and semi-public sector are subject to soft budget constraints (weak financial discipline, and implicit and explicit subsidy from the government). Majority of small private sector companies are not registered and not protected by law and are evading tax and other regulations.
Level 2	Some initiative is taking place to tighten credit and subsidies to corporate sector, but enforcement is weak in bankruptcy legislation and little action taken to strengthen competition and corporate governance. There are some efforts to simplify the corporate registration system to reduce the informal sector.
Level 3	Significant and sustained actions are taken to harden budget constraints and to promote corporate governance. Credit and subsidy policies are tightened and bankruptcy legislation is enforced. Corporate law is updated to strengthen the supervision function of the Board
Level 4	There is substantial improvement in corporate governance, including the wide usage of International Accounting Standard in the corporate sector. Accounting profession has developed and become independent of the corporate client. Disclosure requirement of financial statements has developed. Independent regulatory body has been created to monitor the compliance to the financial disclosure requirement.
Level 5	Corporate governance standards and performance are equal or close to those in typical advanced industrial countries. Effective controls of corporations are exercised through effective functioning of the Board, internal and external auditors and monitoring by independent regulatory bodies. Minority shareholders' interests are protected by the law.

Question 5. Secure Transaction

What is the legal and institutional environment regarding security of transaction?

Level 1	The country has little or no scope for the granting of non-possessory proprietary security
Level 2	Initial reform efforts have been made but much still remains to be done.
Level 3	The countries have made significant reform efforts but the viability of taking security is still compromised by deficiencies in the law and its implementation. In these countries full economic benefit of the reform work has yet to be felt. There is a need to match improvements in the substantive law with progress in implementation.
Level 4	The countries have made major progress in reforming the legal framework for secured transactions, and are also at the advanced stage in the implementation process. In other words, a collateral law has been drafted, which has - to a lesser or greater extent - taken account of the need of commercial transactions in modern market economies.
Level 5	Attention is well paid to the practical operation of the law and the system for collateral registration is created. The laws are operated efficiently and provide maximum economic benefit. The countries have achieved the best practice both in legislation and implementation.

Chapter 1 ICT Development Strategy

Developing ICT requires various pre-conditions, which developing countries often lack. They need a comprehensive strategy to address all these factors. What is the best strategy for a country to develop ICT?

Curriculum Topics:

- 1-1 Why do we need a National ICT Development Strategy?
- 1-2 What should we address in ICT Development Strategy?
- 1-3 What is the Digital Divide?
- 1-4 How to reduce Digital Divide?

1-1 Why do we need a National ICT Development Strategy?

Recently many countries have published nation ICT development strategies. Behind such initiatives there is an increasing recognition that Information and Communication Technology (ICT) is the key enabler in promoting knowledge-based growth, job creation and providing access to information and knowledge for both developed and transition countries.

Access to information and knowledge can stimulate economic growth by creating new products, increasing productivity and promoting new commercial and administrative methods. In addition to economic development, connectivity fosters social development, cohesion and inclusion, through its applications in education, health and increased citizen participation in civil society and government.

Economic Growth and ICT

There are many success stories among both developed and transition countries in achieving a high economic growth through ICT as the key enabling factor: China, Ireland, Korea, Taiwan, Malaysia, and India are among the nations successfully harnessing the full potential of ICT. These countries have successfully created dynamic ICT industry clusters for companies in producing high-technology goods and services in hardware and software industries. There are

also success stories in smaller countries; Malta and Costa Rica successfully increased their Gross Domestic Product (GDP) through focusing on ICT-related hi-tech exports.

Rapid export growth based on high-tech sector is one of the most important factors behind the economic growth (Kusakabe 2004). However, closer review of the correlations between ICT and economic growth reveals that simple telephone penetration ratio, penetration of PCs and internet users do not necessarily correlate highly with such growth. More important factors behind the growth appear to be the business environment (represented by the share of Foreign Direct Investment in GDP), public sector and corporate governance and financial sector development. In addition, various indicators related to the quality of education and innovation correlate quite highly with the relevant per capita income levels.

ICT Strategy as a Tool to Upgrade Business Environment of the Country

This analysis suggests that for the successful development of ICT strategy, simply increasing the physical telecom infrastructure or usage of PC and Internet will not suffice. Essential to successful development are the instruments and mechanisms that underpin the workings of the ICT sector --- an efficient and transparent regulatory framework, creation of broad range of ICT-enabled businesses, a conducive environment for innovation and entrepreneurship, and financial and social

infrastructure to support entrepreneurship are among the critical pre-cursors to ICT development. In essence, ICT is not an objective but a tool for creating a dynamic, innovative and upgraded business environment and knowledge economy.

ICT Strategy as a Consensus Making Process for Change

National ICT Strategy is a framework or process to formulate a country's approach to address the revision of the policy and business environment to achieve such dynamic innovative knowledge-based society. Such a process requires not only activity of the telecom ministry but also the collaboration of all the relevant public sector and private sector organizations to create a broad and comprehensive approach to addressing all sector issues. Consultation and inclusion of all stakeholders is critical and the process to produce such strategy itself is the meaningful process to create consensus for change.

Success Factors of the Strategy Process

Although a strategy must be comprehensive it must also focus on several strategic areas of focus depending upon an individual country's situation:

- (1) The strategy process should be inclusive and involve all the stakeholders. The process also needs high-level political leadership and commitment;
- (2) The strategy process should start with a diagnostic of the current policy reform stage and identify the next steps for policy reform;
- (3) Effective strategy should focus on the most important bottlenecks and provide a systematic solution for all issues;
- (4) Solution of issues should promote as much private sector participation as possible, based on sustainable business models; and
- (5) Solutions should involve scaling up, capacity building and institution building.

e-Sri Lanka as a good example of comprehensive e-development strategy

The e-Sri Lanka project is a high-level initiative to introduce and implement a national ICT Development Strategy, covering a broad areas, ranging from the creation of a new ICT Agency as a regulatory body,

creating rural infrastructure based on the concept of universal access fund, creating a telecenter network, e-government program for the transformation of government service delivery process and social applications of ICT. It is still in the process of implementation, but many lessons can already be learned from this process (Hanna 2004).

Reference:

Hanna, Nagy (2004), "E-Development: Impact and Opportunities" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

1-2 What should we address in an ICT Development Strategy?

The *Digital Divide* cannot be solved simply by installing more telephone lines or computers. Much more important are a favourable business environment, supportive government policies and regulations, institutions and culture to encourage innovation and entrepreneurship, balanced development of ICT-enabled businesses and education system to build a broad range of human capacity to support ICT development. Accordingly, it is necessary to have comprehensive programs to address the following five strategic areas in an integrated strategy.

(1) Liberalized Environment and Supportive Regulatory Framework

ICT businesses emerge only if innovative ideas are allowed to be commercialized. This is particularly true in the communication industry which requires dynamic and innovative technologies and business models. Regulatory frameworks promote and support a liberalized environment in order to allow innovative private-sector firms to enter the market and help expand telecommunication infrastructure. Such an environment and firms will also help create new types of communication markets.

Such a regulatory framework is needed to enhance competition through liberalization, introduction of an independent regulator, privatization of the state-owned telecom operator, ensure new entrant interconnection to the network owned by former monopoly operators, and, tariff reform to ensure the

tariffs reflect cost rather than social considerations.

(2) Achieving Universal Access

It is essential that the benefit of ICT be shared by all citizens. Access to communications infrastructure including telephones and internet connections should be given to all the people, not only to urban living, middle-to-high-income class, but also to people living in rural areas and the poor communities.

Introduction of competition in the telecom market will significantly expand network of services to the country-side. However, remote and sparsely populated regions, often with low-income, will be left out of the commercial initiatives. Thus there is a need for an incentive for private operators to invest in rural telecommunication and governments must address this in the universal access element of their ICT strategies.

A Universal Access Fund is one option to provide such an incentive with minimum amount of subsidy and mobilizing the maximum efficiency of the private sector operators to rural communication services.

Universal Access policy also should address the issue of providing public information access facility for the majority of the people who cannot afford to buy a telephone. Public access facilities, such as community telecenters and *village phone* programs, should be run as sustainable business activities by local entrepreneurs.

(3) Creating Jobs through ICT-Enabled Businesses

ICT strategy can gain support of the government and citizens only if they can create a broad range of job opportunities. Many micro-enterprises may be created by a *village phone* program and by information kiosks and associated services. Based upon such initiatives, local entrepreneurs can create new ICT-enabled businesses, such as content business, software and business process outsourcing industries.

Availability of good and relevant content in local languages is also a prerequisite for the development of the "Information Society". Creation of community and government information sites should be encouraged.

Content industries, including e-learning, e-Health, e-commerce should be developed to provide relevant information and transaction opportunities to match the local people's needs and to provide access to international market for local products and services.

The development and facilitation of ICT-related support industries, such as production and maintenance of PCs and software, networking and other solution industries, and business process outsourcing, such as call centers, medical data maintenance, and back-office support services, are essential for the digital revolution and to bridge the digital divide.

(4) Innovation and Entrepreneurships Support

Innovation and entrepreneurship is the key to the development of knowledge-based growth. To develop various ICT-related industries, it is vital to have a broad human capacity building program to encourage innovation and entrepreneurship.

To best accommodate modern ICT aspirations the education system from primary to tertiary and professional levels should be re-moulded to better suit the dynamic and changing technological progress in ICT. A systematic mechanism to encourage and support entrepreneurs to commercialize innovative technologies should be promoted. Such initiatives should include technology transfer organizations, science parks, incubators, venture capital funds and other entrepreneur support infrastructure.

Eventually transition countries should develop an ICT cluster of dynamic small and high-technology enterprises, which can create innovation and entrepreneurship culture.

(5) Social Entrepreneurs: Important Change Agents

Finally, to develop ICT in transition economies, encouragement and support of social entrepreneurs to utilize ICT for various socially beneficial purposes are essential. There are a growing number of innovative social entrepreneurs and Non-Governmental Organizations (NGOs) working in various sectors using ICT throughout developing and transition nations. Such individuals and organizations are using innovative models to bring about a change in the social process, but,

at the same time, creating realistic business models to ensure sustainability of their operations.

Education, health, environment, rural/urban development, empowerment and governance are typical areas where social entrepreneurs are working and where ICT can be an engine for real change.

Today, the major players within the world of ICT innovation and commercial development are private sector entrepreneurs. However, the government plays a vital role in the process of ICT development. Among other functions, adoption by government of a modern and transparent regulatory framework to support liberalization and allow innovative entrepreneurs to work freely in the information and communication markets is a most important factor in the successful development of ICT.

Competition and Privatization Accelerates the Investment in Infrastructure

In the experience of developing and transition economies, privatization and introduction of competition has accelerated investment in telecom infrastructure and even created a dynamic mobile market which will eventually change the telecom market structure (Vagliasindi 2004). Creating a credible legal framework with a transparent regulatory regime is the one of the only sustainable ways to attract foreign investors in the telecommunication market (Moffatt 2004).

Sequencing of Reform Matters

Many developed and transition countries started with a single state monopoly telecom provider at the beginning of the reform process. It is well-known that the essential components of reform are; introduction of competition to the market, creating an independent regulator, privatizing the state-owned monopoly, together with appropriate interconnection arrangements and tariff reform. However, the issues are much more complicated in the real world. Privatization can arguably create a "private monopoly", usually vertically integrated, in related services. Such an entity can delay interconnection and use cross-subsidy to gain competitive advantages. This creates difficult regulatory issues for the regulators and new entrants to the market (Gillwald 2004). Accordingly, the sequencing, timing and

modality of privatization and liberalization are important.

Creating an Independent Regulator

In order to solve the complex regulatory issues that arise during the reform process independent regulators are often created to "level the playing field" and provide a fair treatment to all market participants, including newcomers and, thus, create confidence in the regulatory framework of the country. Samarajiva (2004) presents likely issues an independent regulator will face and recommends a simple rule-based regulatory model and creation of a more competitive market structure to avoid complicated issues.

Internationally-Endorsed Rules and Good Practices in Inter-Connection and Tariff Reform

The most frequent issues facing the telecom markets in the process of liberalization are inter-connection arrangements and tariff reform. Intven (2004) presents the WTO rules concerning interconnection and, modern practices for tariff re-balancing based on costs and providing incentives to operators to improve productivity.

1-3 What is the Digital Divide?

OECD Definition (2001)

"Digital divide," as defined by OECD (2001), refers to the "gap between individuals, households, businesses and geographic areas at different socio-economic levels with regards both to their opportunities to access ICT and to their use of the Internet for a wide variety of activities." ICT, which stands for Information and Communications Technologies, is the set of activities that facilitate by electronic means the processing, transmission, and display of information (OECD 2001).

Narrowing Gap?

Fink and Kennedy of the World Bank claim that the digital divide is narrowing (Wither the Digital Divide, 2003), as developing countries have been able to "leapfrog" those traditional stages of technological development undergone by their developed counterparts. Fink and Kennedy thus propose a paradigm shift from the digital divide to digital opportunity.

In contrast, Steven Martin (Is the Digital Divide Really Closing? 2003) asserts that computer ownership and Internet use may actually be spreading less quickly among poorer households than among the rich. He argues that without strong political will to reduce the gap, the digital divide could persist for a generation or longer in the United States.

Analysis of the Digital Divide

Although the digital divide does exist among developed countries, it is most prominent between developed and developing countries. According to the International Labor Organization's "World Employment Report 2001: Life at Work in the Information Economy," nearly 90% of all Internet users are in industrialized countries, with the United States and Canada alone accounting for 57% of the total.

Income is an important determinant of PC penetration and access, as are gender, education level, geography, and ethnic background. Low-level income groups, women, individuals with less schooling, rural communities, and ethnic minorities are all less likely to have access to ICT. Even in a developed country such as Japan, men access the Internet from home at about twice the rate of women; similarly, people residing in rural areas and ethnic minorities in Asia receive fewer benefits of ICT.

Causes of the Digital Divide

The lack of necessary hardware, software, and skills for ICT use serves as the starting point of the digital divide. Even those who own a PC but have limited knowledge of its capabilities are likely to face difficulties keeping up with and participating in this emerging era of digital globalization. Internet access charges amount to only 1.2% of the average monthly income in the United States, compared to 191% in Bangladesh and 278% in Nepal, according to the Human Development Report for 2001. New technology gives rise to the need for additional investment and a new learning curve.

Importance of Digital Inclusion

First and foremost, it is every person's right to know about the latest technologies and to reap digital dividend. In addition, if the digital divide continues to prevail, government

policies can neither be disseminated nor implemented effectively.

On the other hand, efforts to reduce the digital divide can enable the private sector to expand its market for ICT goods, promote job growth, and have a significant impact on the quality of life in developing countries.

Reference:

Lee, Jeoung-Keun (2004), "ADB's Experience in Supporting e-Community Centers," Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

1-4 How to reduce Digital Divide?

Models for Reducing Digital Gap

Models for bridging the digital divide are usually developed according to the main causes or problems, as exemplified by the following:

- (a) Infrastructure model,
- (b) Training model, and
- (c) Hardware and training model.

However, we have found that community support models tend to be more effective and reap greater benefits than any of the models above.

Community Support Models

Community support models, intended to provide assistance in both infrastructure and training, are more importantly geared towards sustainable development and can be:

- (a) School-based,
- (b) Public sector-based,
- (c) Private sector-based, or
- (d) Based on community ownership.

Here, Build, Operate, and Transfer (BOT) concepts come into play: Donors can build computer labs and operate them with the stakeholders, and in the project's final stages, the entire project is handed over to the community for operation, maintenance, and further upgrading. ADB adopted variations of the community support model as means to effectively bridge the digital divide in Asia.

Thailand: Skills Development Project

In Thailand, ADB trained IT technicians under the Skills Development Project- an example of the public sector-based model. The project

established IT courses at Skills Development institutes and opened the computer labs for community use; in addition, it provided IT technicians with funds, upon completion of their training, to start small businesses such as telecenters, Internet cafes, and PC repair shops among others.

Viet Nam: Technical Education Project

The private sector-based model can be exemplified by ADB's Technical Education Project in Viet Nam. Under this project, trained technicians are working together with experienced adults to attach production units to technical schools. A production unit operates in the same manner as a private business enterprise, enabling young students to learn business practices of the real world, and adults to learn new technologies. Since production units are maintained on a cost-recovery basis, they can offer cheaper services to the community.

Sri Lanka: Community Information Services for the Poor

The objective of the pilot project is to establish a communications network among

district offices, schools, training institutes, job placement centers, hospitals, markets, private companies and villages which shares vital information with the poor, utilizing cost-effective and feasible communication modes. Information on commodity and crop prices, job opportunities, education and training opportunities, health and medical information, weather and disaster warning, public announcements, etc. are provided to community people. Through the network they can not only share information, but also order goods and services, consult doctors, enroll classes, pay taxes and get certificates. It is the testing ground for e-learning, e-commerce, e-medicine and e-government.

Reference:

Lee, Jeoung-Keun (2004), "ADB's Experience in Supporting e-Community Centers," Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Chapter 2 ICT and Growth

ICT is regarded as a strong enabler for the economic growth. Is there any evidence for such close linkages?

Curriculum Topics:

- 2-1 What countries grew most rapidly?
- 2-2 Is ICT usage engine of growth?
- 2-3 Is ICT good for growth?
- 2-4 Is education engine of growth?
- 2-5 Is Innovation engine of growth?
- 2-6 Is infrastructure engine of growth?
- 2-7 Is trade engine of growth?
- 2-8 What factors explain the high export growth?
- 2-9 Is finance engine of growth?
- 2-10 Is governance engine of growth?
- 2-11 What are the engines of growth? - Summary -
- 2-12 What factors are important to keep higher income levels?
- 2-13 What are the lessons for ICT strategies in emerging countries?

2-1 What countries grew most rapidly?

In the last 10-20 years, a group of countries has shown remarkable growth in per capita GDP, while most of the developing and transition countries suffered a set back in economic growth.

What are the factors determining the economic growth?

Table 2-1 shows top 10 countries in the average growth rate per capita in the recent 11 and 21 years. What are the common factors which explain such high growth in these countries? There are many studies in the recent 40 years analyzing the source of the growth in developing and developed countries.

Table 2-1 Growth Rate of per capita GDP in 11 and 21 years to 2001

	11 years to 2001		21 years
China	8.7%	China	8.2%
Ireland	6.3%	Korea	6.1%
Vietnam	5.7%	Ireland	4.8%
Korea, Rep	4.9%	Botswana	4.8%
Lebanon	4.6%	St. Kitts & Navls	4.6%
Chile	4.1%	Thailand	4.6%
Guyana	4.1%	Mauritius	4.5%
Luxembourg	4.1%	Singapore	4.4%
Mauritius	4.0%	Bhutan	4.2%
Singapore	4.0%	Cyprus	4.2%

Is ICT relating to economic growth?

China, Korea, Ireland and Singapore are all famous for their information and communications technologies (ICTs). Is ICT engine of growth?

Is high income associated with ICT?

Luxemburg, USA, Ireland, Iceland, Norway, Denmark, Switzerland, the Netherlands, Canada --- These countries are the top highest income countries in term of GDP par capita PPP (Purchasing Power Parity) 2001. These are different set of countries from those with highest growth rates. Therefore, the common factors to explain the high level of income will be different from the factors associated with the higher growth. There are several countries in this list which have achieved a high degree of ICT development. Is ICT a determinant for the level of income?

Reference:

Kusakabe, Motoo.(2004). "ICT Development Strategy: Is ICT Engine of Growth?"
Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

2-2 Is ICT usage engine of growth?

The key finding is that the indicators of usage of ICT, such as Internet Users, number of PCs, and Internet Servers per 1000 people, have insignificant correlation with the economic growth. This result has some implication for policy makers, when they formulate an ICT development strategy in their countries. Policies targeted for simply increasing the number of ICT users may not have a significant impact on creating a higher economic growth.

Table 2-2 Correlation Coefficients between ICT Usage and Growth & Income Level

Factors	Growth	Income
Internet Users	26%	83%
PC	23%	92%
Internet Servers	20%	58%

Correlation with income level is very high

On the other hand, correlation between ICT usage and income level is extremely high. This could mean either higher disposable income is spent on ICT or high ICT usage produces high productivity and thus contributing to keep high level of income or both.

Why is correlation between ICT and growth so small?

Why is there such small correlation between ICT usage and economic growth? One hypothesis is that although ICT is an important ingredient for growth, ICT effectively stimulates economic growth only if some other factors are available or some conditions are met. Without such other factors or conditions, ICT cannot ignite growth.

Is ICT luxury goods?

Second hypothesis is that ICT is luxury goods highly correlated to income level and usually high income countries suffer from low growth rate. To some extent both hypotheses apply in the current situation. But this hypothesis may not be substantiated as low income and middle income countries are also suffering from a chronic low growth in the recent decade.

Without other factors, ICT may not ignite growth

In conclusion, it is more likely that ICT itself is not an engine of growth but it needs other factors or conditions to effectively stimulate growth. Then what are such other factors?

Reference:

Kusakabe, Motoo (2004). "ICT Development Strategy: Is ICT Engine of Growth?"
Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

2-3 Is ICT good for growth?

The question of whether the Internet will have an overall impact on the economy comparable to that of the great technological changes of the past has attracted considerable attention in recent years. This is understandable given that between 1987 and 2001 the quality-adjusted price of computing declined by more than 95 per cent, encouraging an extremely fast diffusion of these technologies: in the year 2000, 40 per cent of all US business investment was going to ICT. Such intense investment could be expected to have some effect on business performance. Such effects are not, however, always easy to discern, motivating a desire to assess the validity of the productivity paradox (Solow 1987). At the same time a number of studies have highlighted the limits of the Internet's impact on economic performance, especially in the business-to-consumer (B2C) sector.

Lack of consensus in the previous studies

Many of those research efforts show a positive correlation between Internet and ICT use and productivity growth. Also, much of the recent firm-level evidence suggests that ICT can generate excess returns, and there is also some evidence that these private, or firm-level returns have increased in recent years. This is important because previously there was a lack of consensus regarding empirical results, at least in some of the early studies (Sichel 1997; Berndt, Morrison and Rosenblum 1992; Parsons, Gottlieb and Denny 1993). Using industry-level data, Morrison (1997) also reported that ICT capital had only a very small impact on technical progress.

Strong relationship between ICT and economic performance

The tide appears to have changed in the later studies, as most of the recent papers seem to find a strong relationship between ICT and improvements in economic performance. Stiroh (2001) and Jorgenson and Stiroh (2000) report good news regarding the aggregate impact of ICT investment in the United States. In contrast to their research in the early 1990s, Jorgenson, Ho and Stiroh (2002) conclude that the impact of ICT on aggregate economic performance has increased over time, especially in the late 1990s. From 1995 to 2001, U.S. output grew by 4.07% annually. Computer, software and other communications capital explained 0.93%.

ICT increases the labour productivity and better coordination

Dedrick, Gurbaxani and Kraemer (2003) present interesting findings on what they term the dualistic nature of ICT capital. The authors note that ICT capital, like other types of physical capital, can be used to generate more efficient production technology that allows organizations to increase labour productivity. This phenomenon is known as Capital Deepening (i.e. increasing capital input per worker). However, the authors note that ICT also plays a second role, which they consider more important, namely, its role in diminishing the cost of coordination of economic activities within and between organizations, and in improving business processes and organization. The authors present evidence suggesting that this coordination effect has a greater impact on productivity than the capital-deepening effect.

OECD Study also showed a strong impact of ICT on productivity

A recent study by the Organisation for Economic Cooperation and Development (OECD 2003) analysed the contribution of ICT to economic growth, as well as the impact of ICT-using and ICT-producing sectors compared with that of non-ICT sectors on economic growth and labor productivity. The result was fairly conclusive evidence suggesting that investment in ICT made a significant contribution to economic growth in a number of countries (led by the United States, Canada, the Netherlands and Australia) and also had a substantial positive impact on economic performance in other OECD countries. As for productivity, ICT investment has supported labor productivity growth in several countries with strong growth performance (Australia, Canada and the United States). In some of these countries, sectors in which ICT investment was particularly intense (e.g. distribution and financial services) have experienced faster multi-factor productivity growth. In other countries (Finland, Ireland and Korea), ICT production has made an important contribution to aggregate labour and multi-factor productivity growth. There seems to be evidence that at least part of this productivity improvement is structural, having survived the effects of the latest slowdown, particularly in those countries (e.g. Australia and the United States) where ICT are more widely diffused (OECD 2003).

Reference:

United Nations Conference on Trade and Development (2003), *E-Commerce and Development Report 2003*. Internet Version Prepared by the UNCTAD Secretariat, November 2003 (URL: http://www.unctad.org/en/docs/ecdr2003_en.pdf)

2-4 Is education engine of growth?

Education is thought to be the most important determinant of the economic growth. Many high growth Asian economies are also known as the countries which put strong emphasis on education. In the era of knowledge economy, importance of higher education has become more important.

Table 2-3 Correlations between Education Indicators and Growth & Income Level

Factors	Growth	Income
Expenditure per Student, Tertiary	6%	90%
School Enrolment, Tertiary	10%	71%
School Enrolment, Secondary	13%	70%
School Enrolment, Primary Female	28%	48%
School Completion, Primary	25%	60%
Pupil-Teacher Ratio	-7%	-59%
Repetition Rate	-3%	-37%
PC Installed in Education	-4%	45%

Education has no correlation with growth

However, there is a famous paradox, which was known to developmental economists, that statistically there is almost no correlation between education indicators and economic growth, particularly it is true for the tertiary education. As shown in Table 2-3, only small correlations are found in the female primary education enrolment and primary completion rates, but negligible or negative correlations between indicators representing higher level education and quality of education.

Why does not education accelerate growth?

Why do education indicators have such insignificant correlation with growth? The same explanation applies as in the case of ICT usage. Education is effective only if other factors, such as a good job opportunity, exist for school graduates, and economic incentive system exists to reward better education, etc.

Education and income level have strong correlations

However, there are strong correlations between secondary and tertiary education indicators and income level. Higher level education is both cause and results of the higher level of income, which is synonymous to knowledge-base economy.

Reference:

Kusakabe, Motoo (2004). "ICT Development Strategy: Is ICT Engine of Growth?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

2-5 Is innovation engine of growth?

How about the indicators relating to the science and technologies, such as R&D expenditure, number of scientists and engineers? Innovation and scientific knowledge are thought to be the essential factors for growth particularly in the world of information and knowledge-based economy.

Table 2-4 Correlation between Innovation and Growth and Income Levels

Factors	Growth	Income Level
R&D Expenditure	7%	74%
Scientific Journal Articles	27%	97%
Scientists/Engineers	3%	70%
Patent Applications by residents	-40%	3%

Very small correlation between Innovation and Growth

As shown in the table above, here again statistical correlation between science and innovation related indicators and growth is very low. More surprisingly, correlation between patent application by residents (per GDP) has a negative correlation with economic growth.

High patent application does not lead to higher growth

This means that the simple promotion of science and technologies does not guarantee higher economic growth. This phenomenon is commonly seen in CIS countries; World highest countries in the number of patent applications by residents per GDP is Moldova, followed by Korea, Ukraine, Georgia, Mongolia and Japan. These countries are good at science and technologies but some are successful in commercializing the patent and some are not, due to lack of entrepreneurial support mechanism.

Innovation is a key to maintain high income level

It is without saying that promoting innovation and scientific and engineering capacity is key importance to maintain high income level as shown in the above table. Highest countries in terms of scientists and engineers per 1000 population are Japan, Finland, Iceland, Sweden, Norway, US, and Switzerland. All are famous high tech countries. But CIS countries, Russia, Georgia and Ukraine, follow very closely to this top group.

Reference:
 Kusakabe, Motoo (2004). "ICT Development Strategy: Is ICT Engine of Growth?"
 Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

2-6 Is infrastructure engine of growth?

Physical infrastructure is considered as an important determinant of the economic growth. Actually a few decades ago, the World Bank and all aid agencies are just focusing on investing in infrastructure projects in order to increase growth rate of the economy. Even now in many developing and transition countries, physical infrastructure such as power and transportation is a severe limitation for the business environment.

Table 2-5 Correlation between Infrastructure and Growth

Factors	Growth	Income Level
Road Paved	3%	56%
Electric Power Consumption	4%	33%
Electric Power Losses	-22%	-26%
Telephone Mainlines	25%	92%
Telephone Waiting Time	-43%	-53%

Small correlation between Infrastructure level and growth

However, again ironically, correlation between indicators relating to infrastructure, such as road paved or electric power consumption (kwh per capita) has almost no correlation to the growth rates. Correlation of Telephone Density to growth is still small (25%), but higher than other infrastructure such as power and transportation.

Quality of management correlates with growth

However, if you look at the Table 2-5, indicators which represent the quality of management of infrastructure, such as Electric Power Losses and Telephone Waiting Time before Installation have more significant correlation with growth. This result has some implications when we consider how to improve infrastructure; namely that increase in supply of physical infrastructure by inefficient suppliers may not have significant impact on

growth but improving management of infrastructure by competitive pressures from the market may have much higher impact on economic growth.

Reference:
 Kusakabe, Motoo (2004). "ICT Development Strategy: Is ICT Engine of Growth?"
 Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

2-7 Is trade engine of growth?

So far we looked at indicators which have little correlation with economic growth. Then what are the factors that matter for the economic growth? There are three broad categories which has a significant correlation with economic growth: Trade, Finance and Governance.

Table 2-6 Correlation between Trade and Investment Indicators and Growth

Factors	Growth	Income Levels
Export Growth	62%	18%
FDI (Gross inflow)	20%	45%
Private Capital Flow	6%	35%
Private Investment in Telecommunications	-6%	17%

Strong correlation between export growth and economic growth

Table 2-6 shows that export growth has a high correlation with economic growth (62%), which is the highest correlation coefficient among various indicators, of which correlation we have calculated. This finding is consistent with many previous studies, which shows that trade, especially the export is the most important determinant of the economic growth.

Why is export growth so closely associated with growth?

Why does export have so important association with economic growth? Because the rapid growth of export requires the combination of good business environment, entrepreneurship, management and marketing skills, quality of product, etc. growth of export represents the outcome of competition in the free market.

FDI is important but has small correlation with growth

Foreign Direct Investment (FDI) is also important strategic factor for economic growth. But its correlation with growth (20%) is much less compared to that of export growth. Private capital flows should have a great impact in the economic growth, but in reality, due to the various impediments and imperfect market, the private capital flows do not reflect the growth or growth potential of the developing countries.

Reference:

Kusakabe, Motoo (2004). "ICT Development Strategy: Is ICT Engine of Growth?"
Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

2-8 What factors explain the high export growth?

Then, what are the factors which explain the high performance in export growth in these countries? Table 2-7 lists 10 top performers in export growth. They are mainly East Asian Tigers, plus Ireland, Mexico, and India. What is common to these countries are they export highly income elastic high-tech products, particularly, ICT-related exports.

Table 2-7 Overall Export Growth and ICT Export Performance

1. China	13.7%	OO
2. Korea	12.5%	OOO
3. Thailand	11.5%	OO
4. Ireland	11.0%	OOOO
5. Malaysia	10.8%	OOO
6. Hong Kong	10.6%	O
7. Bangladesh	10.0%	,
8. Mexico	10.0%	OO
9. India	9.1%	.
10. Syria	8.8%	.

ICT Export explains high export growth

World Trade Center (jointly sponsored by UNCTAD and WTO) published performance indicators of ICT related exports in four categories; Electric Machineries and equipment, Electronic Equipment and Components, Office Machinery and Supplies, and, Telecommunication Equipment.

The figures in the centre column of Table 2-7 show the export growth rate of each country published by WDI. Round mark in the right column indicates that these countries are among the top twenty performers in WTC index in those 4 categories mentioned above. It shows very clearly that high export performance in these countries depends heavily on the ICT-related export performance.

India exports ICT services

India is also a good performer of the ICT-related export, namely software services, which are not included in the WTC's exercise (focusing only on manufacturing good export), but clearly India also represents a high export performance based on ICT.

High share of emerging countries in ICT exports

ICT-related goods are no longer a minor part of total exports of emerging-market economies. Data shows that emerging-market economies account for 25 percent of total ICT exports and 35 percent of total ICT imports. In the area of Office Machinery, including assembled computers, Mexico's export is twice as much as Canada's and exports from Switzerland were less than half of the value of exports from Hungary.

Reference:

Kusakabe, Motoo (2004). "ICT Development Strategy: Is ICT Engine of Growth?"
Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

2-9 Is finance engine of growth?

Financial sector is also relevant to the economic growth. There are three indicators representing the volume of financial sector in the economy; Quasi-Money (M2) which represents, liquid obligation of the banking sector, such as cash and demand deposits, Domestic Credit to Private Sector by the banking sector, and Stock traded (all relative to GDP). There are strong correlation between these indicators and the economic growth. Both banking sector indicators and capital market-related indicators have strong correlation with growth but banking sector indicators show higher correlation.

Table 2-8 Correlation between Financial Market Development and Growth

Factors	Growth	Income Levels
M2	39%	53%
Domestic Credit to Private Sector	41%	73%
Stock Traded	21%	55%

High growth is associated with deep financial markets

All high growth countries have relatively developed financial markets. Hong Kong, Malaysia, Thailand, Singapore, China and Korea have almost as deep financial markets as Japan, Switzerland, US and UK both in the banking sector and capital market.

Quality of financial market is also important

These indicators show only quantitative aspects of the financial market. But qualitative aspects, such as regulatory quality and efficiency of the market would be equally or even more important implications for the economic growth. This will be covered by the Governance section.

Reference:

Kusakabe, Motoo (2004). "ICT Development Strategy: Is ICT Engine of Growth?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

2-10 Is governance engine of growth?

Governance issues have strong correlation with the economic growth. Recently, after 50 years of less than satisfactory experience of growth in developing world, development community has realized the importance of governance factors, and put highest priorities to the governance issues. Basically, all the statistical studies show that there is no positive impact of economic aid on growth in developing countries, unless they have good governance.

Table 2-9 Correlation between Governance Indicators and Economic Growth/Income Level

Factors	Growth	Income
Voice & Accountability	27%	68%
Political Stability	38%	69%
Government Effectiveness	47%	87%
Regulatory Quality	48%	72%
Rule of Law	40%	87%
Control of Corruption	40%	89%

All six governance indicators have high correlation with growth

Table 2-9 shows six indicators compiled by Danny Kaufman and his group in the World Bank; Voice & Accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law, and, Control of Corruption. All these indicators have a strong correlation with growth. It is noteworthy that among the six indicators, Regulatory Quality has the highest correlation with growth (48%), followed by Government Effectiveness (47%), Rule of Law (40%) and Control of Corruption (40%).

Governance indicators have more correlation with income level

It is interesting that Governance becomes more correlation with the income level. To maintain high income level needs a higher standard in all aspects of the governance, including the high regulatory quality.

**2-11 What are the engines of growth?
Summary**

In sum, the factors which have strong correlation with the economic growth are:

- Export Growth,
- Primary Education,
- Financial Markets,
- Governance, particularly quality of regulation, and
- Telecom infrastructure and its management.

On the contrary, the factors which have little correlation with economic growth are:

- High Education
- ICT Usage
- Innovation-related Indicators
- Level of Infrastructure

Reference:

Kusakabe, Motoo (2004). "ICT Development Strategy: Is ICT Engine of Growth?"
Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

2-12 What factors are important to keep higher income levels?

Factors which are associated with high income level are somewhat different from those associated with growth.

- ICT usage, such as internet users, number of PCs and servers are higher correlation to the income level.
- In the group of education-related indicators, those related to higher education and quality of education become more close relationship with higher income level.
- Indicators related to innovation, such as number of scientist/engineers, number of academic journal articles, and R&D expenditure per GDP becomes more closely associated with higher income level.
- Infrastructure, especially telecommunication infrastructure has very high correlation with income level.
- Financial market and governance-related indicators show even higher correlation to income level than to growth rates.
- Export growth is still high correlation but Foreign Direct Investment (Gross Inflow) becomes more relevant in explaining the income level.

Reference:

Kusakabe, Motoo (2004). "ICT Development Strategy: Is ICT Engine of Growth?"
Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

2-13 What are the lessons for ICT Strategies in emerging countries?

Development of ICT is not a technical issue of constructing telecom and Internet infrastructure and installing PCs. It is a change of economic system to support the new business models based upon knowledge-intensive technologies. Major players are private entrepreneurs who create

and invest in new business models. As such we need to create a business environment which is conducive to such entrepreneurship development.

Need for Comprehensive Strategy

The study shows that there is a need for a comprehensive strategy to address basic growth factors, such as basic education, financial markets and governance, particularly the quality of regulations. These basic growth factors will eventually create an environment for competitive ICT-related businesses to flourish.

First step is to create a good regulatory framework to attract private investment

Strategy will focus first regulatory reform to attract private investment in telecoms infrastructure in all regions in the country. This is important to create the basis for ICT development and also all the citizen can participate in the beneficial impact of information society.

Create Entrepreneur Support Infrastructure in Selected Regional ICT Clusters

ICT development needs to create a broad ICT-related business sector. These businesses require transfer of new technologies, incubation of start-up businesses, supply of management skills, venture capitalists and linkage with foreign advanced ICT cluster. In the developing country environment, it is difficult to create ICT-enabled businesses all over the country as such infrastructure is not easily available. We need to focus on one geographic region within the country to create such supporting business infrastructure. We call it an ICT cluster.

Creating Jobs through ICT

Creating jobs through ICT at all levels is especially important, in securing political support for ICT development strategy and creating an incentive for the people to participate in the capacity building programs. Creation of Jobs starts with the micro-enterprise of village ladies to re-sell phone services to their villagers, telecenter managers, various technical support businesses and contents industries. This requires a set of policies and entrepreneur support infrastructure.

Capacity Building through Universities as Core

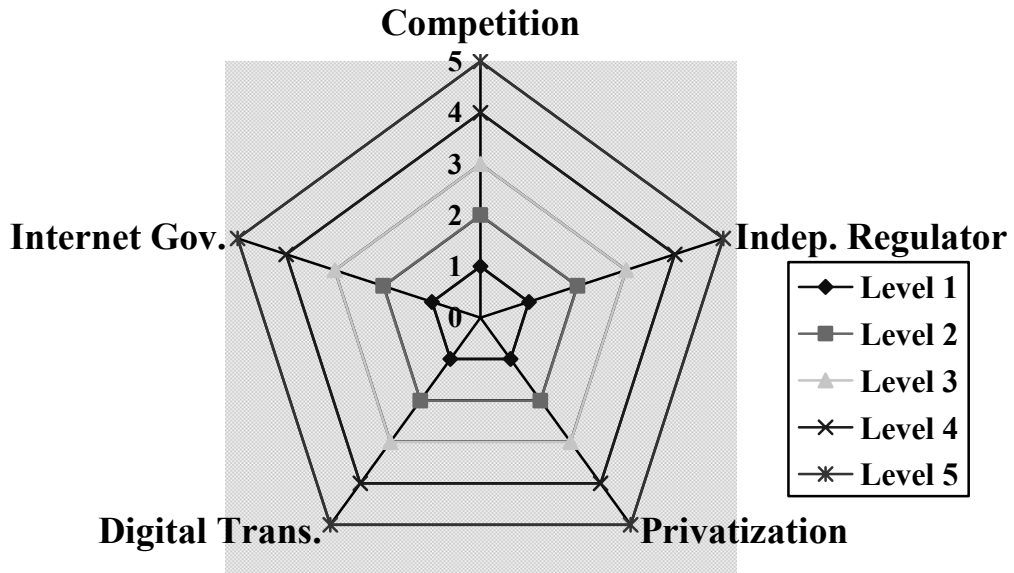
In the preparation and implementation of such comprehensive ICT development strategies, capacity building of local individuals and organizations are essential. As the developing country to develop such capacity, role of the universities are very important. To cope with the ever changing nature of ICT related knowledge, tertiary education should be more closely linked to the business needs, support

knowledge transfer, and create a center for innovation.

Reference:

Kusakabe, Motoo (2004). "ICT Development Strategy: Is ICT Engine of Growth?"
Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Part II Regulatory Framework



Regulation	
Question 6. Promote Competition in Telecoms	
What is the current stage of the government policy to promote competition in the telecommunications market?	
Level 1	There is only one state monopoly telecom provider
Level 2	Government has liberalized the new entry to the mobile phone market
Level 3	Government has allowed the entry of second national operator in the fixed line telecommunications.
Level 4	Government has a rule to allow multiple telecom service providers technology neutral and has interconnection obligations defined in a law.
Level 5	Government has an established transparent tender process to offer new licenses and a clear dispute solving mechanism for interconnection agreements.

Question 7. Creation of Independent Regulatory Body

What is the current stage in developing the Independent Regulatory Body in telecoms services?

Level 1	No distinction between the Ministry and the regulatory body. There is strong political interference in the management decision. No cost-based tariffs system exists with extensive cross-subsidization.
Level 2	Regulatory Body has been created, with ambiguous separation of regulation and management. Tariffs are still politically set.
Level 3	Regulatory Body has been created with substantial independence from the Ministry. There is full separation of telecommunications from postal services. Tariff system has been reformed reflecting the cost of the services.
Level 4	Comprehensive regulatory reform has been made. Cost-based tariff system has been installed. Regulatory body is statutory fully independent of the Ministry.
Level 5	Regulatory Body has been operative for a certain period and established its reputation as being independent and professional. Regulatory and institutional reform has been achieved, to deal with tariffs, interconnection rules, licensing, concession fees, and spectrum allocation. Dispute resolution mechanism has been installed. Consumer ombudsman function is available.

Question 8. Privatization of the State Telecom Operator

What is the current stage of the privatization of State Telecoms Operator?

Level 1	Dominant State Operator has not been commercialized. There is a strong political interference to the management decisions. Tariff is determined politically and there are extensive cross-subsidies.
Level 2	Corporatization of the Dominant Operator has taken place. There is some separation of operation from public sector governance, but the tariffs are still politically set.
Level 3	Full separation of telecommunication and postal services has been achieved. Cross-subsidization has been substantially reduced. Privatization schedule has been announced.
Level 4	Privatization of the dominant operator has taken place.
Level 5	Regulatory framework for private sector participation in all communication areas has been clearly defined.

Question 9. Enforcing Digital Transaction

What is the current stage of the government policy to enforce digital transaction to promote e-Commerce?

Level 1	There is no systematic attempt to address digital signature or authentication issues.
Level 2	The government has adopted rules regarding the legal recognition of digital signatures. But it is not technology neutral, linking legal recognition to the use of specific technology ((e.g. PKI). Certification Authorities are subject to a licencing regime if their certificates are to be legally recognized
Level 3	The government has adopted regulation to recognize digital signature and ensure non-discrimination, but gives specific treatment to those that follow a specific technology.
Level 4	The government implicitly accepts digital documents and signatures. No rules or preferences related to any particular technology exist. There are still requirements in legislation requiring hand-written signatures or other forms of requirements for specific transaction.
Level 5	The government has adopted its legislation to explicitly ensure non-discrimination between digital and hand-written documents and signature. The government is participating in work in international fora such as WIPO, UNCITRAL and OECD to develop internationally coherent legal principles for e-commerce, and take these into account when developing its regulation.

Question 10. Internet Governance and Privacy

What is the government policy towards Internet governance and privacy issues?

Level 1	The government effectively controls access to contents with sensors. Businesses and consumers are unaware of privacy issues; or heavy-handed government approach endangering cross-border data flows.
Level 2	Restrictive rules exist regarding Internet content, government screening. Strict government rules or standards exist for privacy protection with little involvement of industry for their development an/or enforcement.
Level 3	Internet Service Providers are responsible for Internet content carried.
Level 4	Balanced liability solution is available limiting ISP responsibility or systematic control requirement. Companies are well aware of privacy issues, and most companies publish their privacy policy on their website. There is light-handed or no involvement of the government.
Level 5	Effective system of self regulation exists complemented by user-empowering technologies. Established self-regulatory system is available for privacy protection, based on self-regulatory codes and/or seal program.

Chapter 3 Liberalization Strategy

First step for ICT development is the liberalization of communication industries. Scope and sequencing of the liberalization influence the outcome. What is the best liberalization strategy for a country?

Curriculum Topics:

- 3-1 Why is telecommunications reform needed?
- 3-2 What are the key elements of the of the multilateral reform model?
- 3-3 What are the necessary components of telecoms reform?
- 3-4 What are the key challenges in telecom reforms?
- 3-5 What about sequencing of reforms?
- 3-6 What is privatisation and why has it been emphasized in the reform process?
- 3-7 What have some of the effects been?
- 3-8 Has privatization contributed to sector growth and national objectives?
- 3-9 What are some of the associated policy and regulatory challenges for developing countries undergoing telecom reform?
- 3-10 How might these challenges be overcome in order to build an efficient info-structure required by a modern economy?
- 3-11 What are the lessons of reforms to date?
- 3-12 How to overcome constraints to regulatory reforms?

3-1 Why is telecommunications reform needed?

Poor Teledensity

After over 50 years of public monopoly provisioning of telephony, fixed teledensity in Africa stands at less than 2% and even if one includes mobile, less than 10% of the population have telephone service.

Rationale of Telecommunications as Natural Monopoly Undermined by Digitized Low Cost Technologies

In addition to the particularly poor performance of public monopolies in many developing countries, new low cost digital technologies undermined arguments around telecommunications being a 'natural monopoly' that could only be economically delivered by a single network in order to

achieve the necessary economies of scope and scale.

Marginalization from Global Economy and Own Developmental Objectives

Countries that are unable to take up the challenges posed by global technological (digitalization) and economic trends (liberalization) are increasingly marginalized, not only from the global network economy, but in their ability to deliver on their own developmental objectives.

Challenges of Affordable Access and Accelerated Network Development

Central public policy challenge facing African decision-makers remains ensuring affordable access to services while creating the conditions for the development of the information infrastructure needed to operate a modern economy.

Competitive market forces will result in the more efficient allocation of resources

However, the demands for network extension on the scale required in developing countries cannot possibly be met with state resources only. The solution posed by multilateral development and funding agencies has been to liberalize markets through privatization of the incumbent monopoly and by introducing competition. Competition theory argues that competitive market forces will result in the more efficient allocation of resources in an economy which will result in lower prices for consumers.

Reference:

Gillwald, Alison. (2004), "Rethinking Telecom Reform Model: the Case of South Africa" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

3-2 What are the key elements of the multilateral reform model?

Privatization, with Extension of Monopoly

A key element of the reform model is the partial or full privatization of the incumbent, in order to introduce commercial efficiencies into the incumbent. In order to attract investors, provide the incumbent with time to prepare for competition, and protect its revenues while it extends the network, the monopoly of the now privatized entity is usually extended for a period of time.

Limited Liberalization Network and Service-Based Competition

This often meant that in the first phase of reform, competition is restricted either to services such as Value Added Network Services (VANS) or Internet Services Providers (ISP) and sometime Mobile Telephone Networks (MTN). Competition in these areas are often further restricted by limitations on the services that can provide, such as voice services or requirements that service providers acquire their telecommunication facilities from the privatized monopoly.

Sector Regulator

As competition is restricted and perfect market conditions absent, a regulator is

required for the sector to remove the regulatory functions from the operator or Ministry, who are generally still partial owners of the dominant player in the field. The regulator during the first phase of reform acts as a proxy for competition by ensuring fair access to the incumbent's network and cost-based prices for consumers. As the sector becomes more liberalized the regulator performs less economic regulation and more competition regulation. This focuses on constraining market power of dominant operators where activities are exclusionary or anti-competitive and creating incentives for new market entry.

Universal Access and Market Failure Mechanism to Service Poor

As market failure is likely even when greater competition exists, the regulator would continue to be responsible for social regulation such as universal service compliance and special services for the disabled. Some mechanism for supporting universal services, such as a universal service levy or fund usually therefore accompanies the reform model.

Reference:

Gillwald, Alison (2004), "Rethinking Telecom Reform Model: the Case of South Africa" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

3-3 What are the necessary components of telecoms reform?

In many developing countries, telecommunications sector is characterized by a state monopoly telecom service provider which has an obligation to provide universal service to the whole population. However, they often suffer from inefficiency of management and lack of government budget to make a necessary investment to achieve a speedy progress towards universal access.

Therefore, the governments try to liberalize and privatize the telecom sector to attract private sector efficiency and investment. Then, what are the necessary components of such telecom sector reform?

Encouraging Interconnectivity by the Incumbent Companies

Anti-competitive behaviour by incumbent telecommunication companies, e.g. charging excessive rates for interconnection, refusing to build or make available adequate interconnection capacity, refusing to unbundle network elements or services needed for efficient interconnections, has retarded or prevented competition in telecom market in many countries. Mandatory interconnections and unbundling of public switched telephone networks are needed to make the telecom sector more competitive.

Privatization is necessary

Many emerging markets have yet to privatize telecommunications. Privatization is essential for making telecom services more efficient, because without it competition will be hindered and key services will be costly, which leads to widening of the digital divide.

Liberal Licensing Policy

In many countries the licensing of competitive operators must be enhanced to give domestic and international telecom providers sufficient incentives to compete within and across media, e.g. fixed line, cellular, and so on.

Independence and Transparency of Regulatory Agencies

Regulatory authorities must be independent, and regulatory process must be transparent. To enhance the governance of such agencies, a complex issue in emerging markets, certain international and objective standards must be applied in such areas as interconnections, licensing and pricing.

Price cap regulations that ensure price increases for telecom services are in line with general price changes can make services more efficient and reduce regulatory lags. Such regulations should not, however, place undue discretions in the hands of the existing telecom companies or in the regulatory authority.

Universal Access Fund

Targeted universal access funds may help increase access to telecom services in countries with great income diversity. Chile and Peru provide examples of effective funds.

Reference:

Intven, Hank, Jeremy Oliver, and Edgardo Sepulveda (2000), *Telecommunications Regulation Handbook*. World Bank, InfoDev Program, Washington, D.C.
<http://www.infodev.org/projects/314regulationhandbook/>

3-4 What are the key challenges in telecom reforms?

Privatization and Regulation

If the regulator is not independent, the government is still able to interfere even if the network utility is privatized. Even with an independent regulator the difficult challenge facing the national government is to endow it with technically competent people and give them the authority and budget needed to implement its mandate effectively.

Network industries are typically capital-intensive and the needed investment is sector-specific. That is, it cannot be easily re-allocated and can be viewed as 'sunk'. As a consequence, a fair return on capital is guaranteed only if the private investment plan for the utility is successfully implemented over sufficiently long time horizons that permit the private owner to recoup the sunk investment.

This requires as a precondition for the existence of a stable regulatory framework. The investor makes its decisions based on the announced regulatory policy and its credibility. Insecurity, lack of transparency and predictability represent critical problems that could potentially deter investment.

Competition and Privatization

Private ownership and competition are the two essential ingredients of a market economy. The order in which they are introduced in the state-owned network utilities, however, is very important. Allowing private companies to compete with a monopoly state-owned enterprise can put pressure on the public enterprise to become more efficient and eventually could lead to its privatization.

But while competition may well lead to privatization, the opposite is not true. To the

contrary, a privatized monopoly will often attempt to use its money and political influence to stifle reforms, especially ones that threaten to introduce greater competition.

Regulation and Competition

Regulation is needed to support competition. There are important regulation involves designing rules to ensure the emergence of effective competition, by providing third party access to the incumbent's network. Interconnection is critical in providing efficient investment and effective competition. If the regulator fails to understand interconnection it can distort market entry signals, invalidate investments and allow/encourage the abuse of dominant positions to the detriment of consumers.

Those operators with the ability to abuse their market power should be subject to special rules (ex-ante regulation) to ensure that they do not abuse their dominance. These include a requirement to meet all reasonable demands for interconnection services from other network operators, transparent and cost-based interconnection, unbundling of interconnection charges, non discrimination and publication of interconnection offers (terms and condition of contract and prices).

Reference:

Vagliasindi, Maria. (2004.), "Telecom Reforms in Transition Economies: Progress and Challenges" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

3-5 What about sequencing of reforms?

To be effective telecom privatization should be complemented by measures stimulating competition and broader regulatory reforms.

Establishing an Effective Regulatory Structure before Privatizing Network Utilities

It is important to build the institutional and regulatory framework first and then to privatize, as opposed to simply creating a private monopoly. An effective legal and regulatory framework is essential to attract private investment and guarantees;

- (i) Separation of operational and regulatory rules, and
- (ii) Independent settlement of disputes.

Introducing Greater Competition if Possible before Privatization.

It is also of paramount relevance to introduce greater competition if possible before privatization. Otherwise it will be difficult to change market structure post privatization.

Reference:

Vagliasindi, Maria. (2004.), "Telecom Reforms in Transition Economies: Progress and Challenges" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

3-6 What is privatization and why has it been emphasized in the reform process?

Transfer of Ownership from State to Private Interests

Privatization refers to the transfer of ownership of state assets to private interests. The rationale for this is that the profit imperative will produce efficiencies within the incumbent that will ultimately result in lower prices for consumers. In the initial stages of privatization lower prices have to be balanced against requirements on the incumbent to make sufficient return on investment reinvested in network extension.

Struggle between Market Access Desire of Multilateral Agencies and Maximization of Value of State Assets or Instruments of Income Generation

While formally concerned with policies to achieve affordable access through improving efficiency of incumbents in practice the process of privatization is often a struggle between market access desire of foreign companies and the reluctance of developing countries to lose a major source of income generation.

Licence negotiations tended to focus the optimization of the value of the state asset

Licence negotiations tended to focus the optimization of the value of the state asset in exchange for increased rights and opportunities to generate revenues by the privatized entity.

Privatization often creates vertically integrated dominant player

In order to protect incumbent revenues, ostensibly to extend the network, they are generally permitted to compete in mobile, VANS or ISP market segments, in addition to their upstream core components, while players in the competitive market segments have also been required to acquire their facilities from the incumbent.

Coordination among many actors

Co-ordination among multiple actors in the supply of complex information and communication systems is necessary to meet variety of social and economic objectives.

Reference:

Gillwald, Alison (2004), "Rethinking Telecom Reform Model: the Case of South Africa" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

3-7 What have some of the effects been?

Markets Structured Around Vertically Integrated Incumbents

The effect of this has been the establishment of markets structured around vertically integrated incumbents who compete downstream against competitors who are required to get their facilities very often from their competitor. This generally results in anti-competitive incentives for the incumbent to deny access to its network.

Anti-Competitive Incentives for the Incumbent

The traditional regulatory response to this vertically integrated market structure is access regulation. This includes ensuring that wholesale access is cost-based and timerously provided and that retail tariffs are cost-based and fair to consumers.

Due to the anti-competitive incentives inherent in market structure especially for the incumbent to deny access to its network, the regulator is constantly adjusting the anti-competitive behaviour of the incumbent.

Need for Access Regulation

The result is an inherently resource-intensive regulatory regime, with inherent information

asymmetries that undermine the ability of the regulator even in far more resources environments, to be effective.

Reference:

Gillwald, Alison (2004), "Rethinking Telecom Reform Model: the Case of South Africa" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

3-8 Has privatization contributed to sector growth and national objectives?

Experience of South Africa

In South Africa, total growth of the sector from R7billion in 1992 to over R50billion in 2001 masks a number of policy and implementation failures and is not particularly impressive when benchmarked against other lower middle income countries. Even up to 2001 when the growth rate was at its best at around 36%, it was relatively low compared to Poland 50%, Turkey 81% and Korea 99%.

The major disappointment of reform has the failure to double the network to 6 million subscribers during the exclusivity. In fact during this time around 2 million subscribers were disconnected from the network following local prices increase by average 24% a year, way beyond that anticipated from tariff rebalancing and this despite significant efficient gains in the company with 30,000 job losses and the recording of monopoly profits in 2004.

However, the number of mobile subscribers has dramatically outstripped those of the public switch network at around 18 million in 2004, four times faster than public sector switch network. This is largely an unintended outcome of policy which never envisaged it as the platform for universal voice access.

Meanwhile, the impact of the monopoly on the critical segments of the market for innovation, the VANS and ISPs, has been chilling. The VANS market segment shrunk from 5.5 million in 1999 to 4.9 million in 2002 at a time that this market segment has grown internationally with a proliferation of new services and applications. Internet penetration has slowed and the time spent on

the Internet decreased as telecommunications costs make up 80% of total Internet service costs.

Reference:

Gillwald, Alison (2004), "Rethinking Telecom Reform Model: the Case of South Africa" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

3-9 What are some of the associated policy and regulatory challenges for developing countries undergoing telecom reform?

Structural Conflict of Interests between Shareholder Ministry and Regulator

Partial privatizations, common in many parts of the world, result in the retention of ownership in the incumbent by the State usually through the line Ministry, which is also in charge of the reform model responsible for the overall policy of the sector and therefore the well-being of its competitors. Usually this potential conflict of interests is compounded by the retention by the State of certainly regulatory powers in order for the State to deliver the services on its contract with strategic investors.

Stimulating Long-Term Investment While Regulating Fair Prices

Stimulating long term investment required in order to build the capital intensive infrastructure required for a modern economy needs to be balanced against the regulation of fair prices for users and consumers.

Inability to Regulate Private Monopoly

The inability to regulate private monopoly effectively and to establish cost-based regulatory tools is likely to have a negative effect not only on wholesale and retail pricing within the sector, but also on the economy as a whole.

But this kind of access regulation is resource intensive and even skilled and experienced regulators cannot overcome information asymmetries. Regulators in developing countries need to develop incentive-based regulatory practices and tools that reduce the requirement for regulation and utilize and refine alternative tools such as

benchmarking to fast-track the introduction critical competition levers such as interconnection.

Reference:

Gillwald, Alison (2004), "Rethinking Telecom Reform Modell: the Case of South Africa" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

3-10 How might these challenges be overcome in order to build an efficient infrastructure required by a modern economy?

Removal of Artificial Restraints on Market

Artificial distinctions that exist between voice and data or fixed and wireless etc. in the statutes of many developing countries to protect the revenues of the incumbent undermine the benefits of new digital technologies that can enhance affordable access such as VOIP, VSAT, WiFi.

Allowing for market efficiencies will allow commercial response to unmet demand for services reducing the requirement for universal service subsidies. Currently, those who can afford services but who are not receiving them due to network and investment constraints can be serviced by commercial operators rather than through expensive state services or subsidies, or who continue to receive not services at all.

Universal access levies stimulates market growth

Regulated market accompanied by innovative deployment of universal access levies, that stimulate market growth through innovative new entry, increased calling opportunities and lower costs can more efficiently meet demand.

Gap-Filling by Alternative Operators

Gaps in market can be cost-effectively filled by enabling alternative operators to come into areas regarded as unprofitable by incumbents, and flexible access, billing and payment can bring low income subscribers onto networks.

Structural Separation of Market

Need for resource-intensive regulation can be reduced with a structurally separated market which affects anti-competitive incentives for the incumbent to deny access to its network to rival firms either through delays or pricing strategies. Structural separation creates competitive incentives, making it easier to set tariffs for non-competitive essential facilities, due to separation of the component parts and accounts. With tariff fee structure sufficiently above cost and no business unit to protect downstream, there will be an incentive to encourage access.

Reference:

Gillwald, Alison (2004), "Rethinking Telecom Reform Model: the Case of South Africa" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

3-11 What are the lessons of reforms to date?

Sequencing of Reform Stages

The sequencing of reform needs to be carefully assessed in terms of the particularities of the environment. Extended monopolies can have chilling effects on competitive sectors, ISPs, VANS and drag on national economy. The emphasis on privatization particularly with an exclusivity at the expense of competition may achieve more lucrative short-term gains for the State but these may come with some long-term costs to the sector's efficiency and indeed the national economy.

Appropriateness of Policy and Conduciveness to Implementation

The appropriateness of policy and resulting market structures and regulatory regimes needs to be considered in relation to their conduciveness to implementation. Complex, resource intensive regulatory requirements with inherent information asymmetries set regulators up for failure and create environments of uncertainty that is not conducive to the critical investment required for development of information infrastructure.

Efficiencies associated with vertically-integrated operations need to be weighed against cost

Efficiencies associated with vertically integrated operations need to be weighed against cost to industry and cost to resource-intensive regulation. Core infrastructure may remain natural monopoly but demand for communications services innovatively should be met through strategic regulation of market forces.

Demand for Communications Met Through Market Mechanisms

Demand for communications should be met through market mechanisms, especially when artificial constraints are removed, which can relieve demand on State subsidies, which can be transparently targeted.

Reference:

Gillwald, Alison (2004), "Rethinking Telecom Reform Model: the Case of South Africa" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

3-12 How to overcome constraints to regulatory reforms?

How can we overcome constraints to infrastructure regulatory reforms, due to market size, lack of sector specific regulatory expertise and the credibility of national governments in establishing a regulatory environment?

Alternative Solutions to Explore

A. Regional vs national approach to regulation: (This is something that is already proposed in the case of South and Eastern Europe, but might be useful for Central Asia.)

B. Cross-sectoral competition policy vs sectoral regulatory approach (e.g. Kazakhstan) the regulatory functions have been shifted to the competition authorities

Addressing Specific Challenges

Regulatory incentives can be created through specific universal access policies and public investment subsidies schemes. Such strategies of public support can maximize their impact by leveraging private investment through minimal and well targeted subsidies to achieve commercial viability in the long run. The successful experience of some Latin American

countries, such as Chile and Peru, can be used to guide some of countries in transition countries. In Chile and Peru, many licenses awarded through competitive bidding process (where the lowest bidder was awarded the subsidy and right to operate network to expand services) were granted with a zero subsidy.

Reference:

Vagliasindi, Maria (2004), "Telecom Reforms in Transition Economies: Progress and Challenges" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Rethinking telecom reform model: the case of South Africa.

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Q 1: Why is telecommunications reform needed?

- After over 50 years of public monopoly provisioning of telephony, fixed teledensity in Africa stands at less than 2% and even if one includes mobile, less than 10% of the population have telephone service. In addition to the particularly poor performance of public monopolies in many developing countries, new low cost digital technologies undermined arguments around telecommunications being a ‘natural monopoly’ that could only be economically delivered by a single network in order to achieve the necessary economies of scope and scale.
- Countries that are unable to take up the challenges posed by global technological (digitalisation) and economic trends (liberalisation) are increasingly marginalised, not only from the global network economy, but in their ability to deliver on their own developmental objectives.
- Central public policy challenge facing African decision-makers remains ensuring affordable access to services while creating the conditions for the development of the information infrastructure needed to operate a modern economy.
- However, the demands for network extension on the scale required in developing countries cannot possibly be met with state resources only. The solution posed by multilateral development and funding agencies has been to liberalize markets through privatization of the incumbent monopoly and by introducing competition. Competition theory argues that competitive market forces will result in the more efficient allocation of resources in an economy which will result in lower prices for consumers.

Q2: What are the key elements of the of the multilateral reform model?

- A key element of the reform model is the partial or full privatization of the incumbent, in order to introduce commercial inefficiencies into the incumbent. In order to attract investors, provide the incumbent with time to prepare for competition, and protect its revenues while it extends the network, the monopoly of the now privatized entity is usually extended for a period of time.
- This often meant that in the first phase of reform, competition is restricted either to services such as Value Added Network Services or Internet Services Providers and sometime Mobile Telephone Networks. Competition in these areas are often further restricted by limitations on the services that can be provided, e.g. voice services or requirements that service providers acquire their telecommunication facilities from the privatised monopoly.
- As competition is restricted and perfect market conditions absent, a regulator is required for the sector to remove the regulatory functions from the operator or Ministry, who are generally still part owners of the dominant player in the field. The regulator during the first phase of reform acts as a proxy for competition by ensuring fair access to the incumbent’s network and cost based prices for consumers. As the sector becomes more liberalized the regulator performs less economic regulation and more competition regulation. This focuses on constraining market power of dominant operators where activities are exclusionary or anti-competitive and creating incentives for new market entry.
- As market failure is likely even when greater competition exists, the regulator would continue to be responsible for social regulation such as universal service compliance and special services for the disabled. Some mechanism for supporting universal service, such as a universal service levy or fund usually therefore accompanies the reform model.

Q3. What is privatization and why has it been emphasized in the reform process?

- Privatization refers to the transfer of ownership of state assets to private interests. The rationale for this is that the profit imperative will produce efficiencies within the incumbent that will ultimately result in lower prices for consumers. In the initial stages of privatisation lower prices have to be balanced against requirements on the incumbent make sufficient return on investment reinvest in network extension.
- While formally concerned with policies to achieve affordable access through improving efficiency of incumbents in practice the process of privatisation is often a struggle between market access desire of foreign companies and the reluctance of developing countries to lose a major source of income generation.
- Licence negotiations tended to focus the optimisation of the value of the state asset in exchange for increased rights and opportunities to generate revenues by the privatised entity.
- In order to protect incumbent revenues, ostensibly to extend the network, they are generally permitted to compete in mobile, VANS or ISP market segments, in addition to their upstream core components, while players in the competitive market segments have also been required to acquire their facilities from the incumbent.
- Co-ordination among multiple actors in the supply of complex information and communication systems to meet variety of social and economic objectives.

Q4. What have some of the effects been?

- The effect of this has been the establishment of markets structured around vertically integrated incumbents who compete downstream against competitors who are required to get their facilities very often from their competitor. This generally results in anti-competitive incentives for the incumbent to deny access to its network
- The traditional regulatory response to this vertically integrated market structure is access regulation. This includes ensuring that wholesale access is cost based and timorously provided and that retail tariffs are cost based and fair to consumers.
- Due to the anti-competitive incentives inherent in market structure especially for the incumbent to deny access to its network, the regulator is constantly adjusting the anti-competitive behavior of the incumbent. The result in an inherently resource intensive regulatory regime, with inherent information asymmetries that undermine the ability of the regulator even in far more resources environments, to be effective.

Q5. Has privatization contributed to sector growth and national objectives?

- Total growth of the sector from R7billion in 1992 to over R50billion in 2001 masks a number of policy and implementation failures and is not particularly impressive when benchmarked against other lower middle income countries. Even up to 2001 when the growth rate was at its best at around 36% it was relatively low compared to Poland 50%, Turkey 81% and Korea 99%.
- The major disappointment of reform has the failure to double the network to 6 million during the exclusivity. In fact during this time around 2 million subscribers were disconnected from the network following local prices increased of on average 24% a year, way beyond that anticipated from tariff rebalancing and this despite significant efficient gains in the company with 30 000 job losses and the recording of monopoly profits in 2004
- While the number of mobile subscribers has dramatically outstripped those of the public switch network at around 18 million in 2004 this is largely an unintended outcome of policy which never envisaged it as the platform for universal voice access. Meanwhile the impact of the monopoly on the critical segments of the market for innovation, the VANS and ISPs, has been chilling. The VANS market segment shrunk from 5.5 million in 1999 to 4.9 million in 2002 at a time that this market segment has grown internationally with a proliferation of new services and applications. Internet penetration has slowed and the time spent on the Internet decreased as telecommunications costs make up 80% of total Internet service costs.

Q6. What are some of the associated policy and regulatory challenges for developing countries undergoing telecom reform?

- Partial privatisations common in many parts of the world result in the retention of ownership in the incumbent by the state usually through the Ministry responsible for it, who is also in terms of the reform model responsible for the overall policy of the sector and therefore the wellbeing of its competitors. Usually this potential conflict of interest is compounded by the retention by the State of certainly regulatory powers in order for it to deliver on its contract with strategic investors.
- Stimulating long term investment required in order to build the capital intensive infostructure required for a modern economy needs to be balanced against the regulation of fair prices for users and consumers.
- The inability to regulate private monopoly effectively and to establish cost based regulatory tools is likely to have a negative effect not only on wholesale and retail pricing within the sector, but on the economy as a whole.
- But this kind of access regulation is resource intensive and even skilled and experienced regulators cannot overcome information asymmetries. Regulators in developing countries need to develop incentive based regulatory practices and tools that reduce the requirement for regulation and utilise and refine alternative tools such as benchmarking to fast-track the introduction critical competition levers such as interconnection.

Q7. How might these challenges be overcome in to build an efficient infostructure required by a modern economy?

- Artificial distinctions that exist between voice and data or fixed and wireless etc. in the statutes of many developing countries to protect the revenues of the incumbent undermine the benefits of new digital technologies that can enhance affordable access e.g. VOIP, VSAT, WiFi.
Allow for market efficiencies will allow commercial response to unmet demand for services reducing the requirement for universal service subsidies. Currently, those who can afford services but who are not receiving them due to network and investment constraints can be serviced by commercial operators rather than through expensive state services or subsidies, or who continue to receive not services at all.
- Regulated market accompanied by innovative deployment of universal access levies, that stimulate market growth through innovative new entry, increased calling opportunities and lower costs can more efficiently meet demand.
- Gaps in market can be cost effectively filled by enabling alternative operators to come into areas regarded as unprofitable by incumbents and flexible access, billing and payment can bring low income subscribers onto networks.
- Need for resource intensive regulation can be reduced with a structurally separated market which reduces anti-competitive incentives for the incumbent to deny access to its network to rival firms, whether through delays or pricing strategies. Structural separation creates competitive incentives, easier to set tariffs for non-competitive essential facilities, due to separation of the component parts and accounts. With tariff fee structure sufficiently above cost and no business unit to protect downstream, incentive to encourage access.
- Create conditions for development of information infrastructure – integrated network, services, applications and content - needed for modern economy and global participation

Q8. What are the lessons of reforms to date?

- The sequencing of reform needs to be carefully assessed in terms of the particularities of the environment. Extended monopolies can have chilling effect on competitive sectors, ISPs, VANS and drag on national economy. The emphasis on privatization particularly with exclusivity at the expense of competition may achieve more lucrative short term gains for the

- state but these may come with some long term costs to the sector's efficiency and indeed the national economy.
- The appropriateness of policy and resulting market structures and regulatory regimes needs to consider in relation to their conduciveness to implementation. Complex, resource intensive regulatory requirements with inherent information asymmetries set regulators up for failure and create environments of uncertainty that is not conducive to the critical investment required for development of infostructure.
 - Efficiencies associated with vertically integrated operations need to be weighed against cost to industry and cost of resource intensive regulation. Core infrastructure may remain natural monopoly but demand for communications services innovatively met through strategic regulation of market forces.
 - Demand for communications met through market mechanisms, especially when artificial constraints are removed, which can relieve demand on state subsidies, which can be transparently targeted.

Chapter 4 Promoting Competition

Competition in communication market will produce a huge gain in performance and reduction of cost. In this way increase the telephone density and variety of other services. How best to introduce the competition?

Curriculum Topics:

- 4-1 What is important for promoting competition?
- 4-2 How to ensure a fair competition from the Incumbent Operator?
- 4-3 What has been the impact of competition (through the introduction of a second mobile operator)?

4-1 What is important for promoting competition?

Investors prefer to place their money in countries where all the policy issues have been resolved in the law. If translated into telecom policy jargon, this would mean that a law is likely to reply to investors' needs in the following areas:

Clear Liberalization Timetable

Investors need to know when competition will be permitted and the scope of the forthcoming liberalization. It is important to know whether entry barriers will be removed totally or if there will be a gradual introduction of competition; whether there will be cumbersome licensing requirements or a simple registration procedure for all new entrants; whether there will be tendering procedures for a limited number of licenses; or whether licences will be awarded to all candidates that satisfy the requirements.

Define the margins of discretionary power

Investors need to be able to predict the decisions of the licensing and/or regulatory authority. This can only be achieved if the legal framework provides clear guidance on the criteria to be used for reaching a decision. Investors want to know in advance when an application for a license is likely to be rejected and when an obligation to provide interconnection at lower prices may be imposed.

Conditions for License or Concessions

It is important for investors to know upfront whether they are likely to face an obligation to contribute to a universal service fund, whether some of their tariffs may be regulated, or, whether they will be entitled to obtain wholesale prices when entering into an interconnection agreement with another operator.

Reference:

Styliadou, Meni (2002), *The Building Blocks for Telecoms Reform - Legal Rules, Institutions and Culture*. Legal Transition, EBRD
<http://www.ebrd.com/country/sector/law/telecoms/about/building.pdf>

4-2 How to ensure a fair competition from the Incumbent Operator?

The telecommunications industry has a very peculiar feature: the survival of any new entrant depends on its harmonious cooperation with its worst competitor, the incumbent operator. In most cases a new entrant will need to lease capacity and conclude interconnection agreements with the incumbent operator of each country it tries to penetrate. Forcing the incumbent operator to cooperate with those that threaten its cosy monopoly is obviously a difficult task.

Setting a Rule

In most countries this problem is addressed by adopting a set of rules designed to force the incumbent operator to provide all new entrants with transparent, objective and non-discriminatory access to its network.

The following identifies the main patterns of behaviour that an incumbent operator is likely to adopt to protect its market position, and describes the rules that need to be included in the regulatory framework to encourage the gradual emergence of competition in the market.

Refusal to Provide Access on Fair and Reasonable Term

An outright refusal is rather unusual since it would be immediately characterised as anti-competitive behaviour. Operators became increasingly sophisticated in the arguments they develop to protect their monopolies. Technical arguments and discriminatory pricing are some of the most common methods.

Technical arguments are normally dealt with by imposing on the operator the obligation to publish its interfaces and provide to the regulator all necessary information on the development of the network.

Pricing Issues

Pricing issues, however, are more difficult. New entrant cannot penetrate the market successfully if their costs are significantly higher than those of their main competitor, the incumbent operator. Interestingly, a major part of those costs is the charges they need to pay to the incumbent for interconnection. The incumbent's incentive for maintaining the interconnection prices at the highest possible level could not be more obvious: Not only would this increase its profits but it would also keep the competitors out of the market.

Regulators all over the world have spent much time and efforts trying to ensure that interconnection charges are cost-oriented and do not exceed what incumbent operator charge internally. The approach that appears to be becoming universally accepted is to have the interconnection charges approved and monitored closely by the regulator, to develop

a methodology on how cost accounting needs to be conducted, and to adopt guidelines on how the "correct" interconnection price should be determined.

Attempt to Proceed to Unfair Cross-Subsidization

Cross-subsidization occurs when an operator uses monopoly profits or revenues from a market where it holds a dominant position in order to subsidize its activities in another market that it wants to penetrate. Cross-subsidization becomes unfair and therefore prohibited only if the operator provides its activities below marginal cost, thereby undercutting all actual or potential competitors and ousting them from the market.

Unfair cross-subsidization is a classic phenomenon in the telecoms industry. Most incumbent operators are tempted to use some of the monopoly profits generated by public voice telephony in order to undercut their competitors in the new market where competition has been allowed.

Separation of Accounts

The usual regulatory reply to this phenomenon is to impose on the incumbent or any other dominant operator an obligation to keep separate accounting for the various activities and to have the books audited regularly by independent auditors appointed by the regulator. Here again, detailed cost accounting rules need to be developed to limit the risks for unfair cross-subsidization

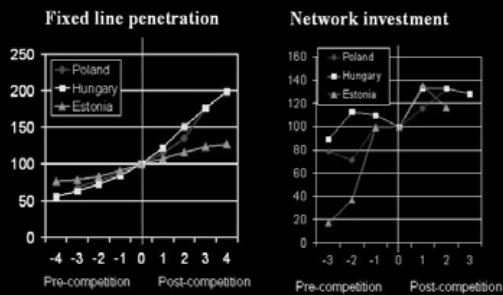
Reference:

Styliadou, Meni (2002), *The Building Blocks for Telecoms Reform - Legal Rules, Institutions and Culture*. Legal Transition, EBRD
<http://www.ebrd.com/country/sector/law/telecoms/about/building.pdf>

4-3 What has been the impact of competition (through the introduction of a second mobile operator)?

Fixed-line Penetration

Links between competition and performance indicators



The above figures are constructed reporting on the x-axis the time dimension, where 0 indicates the time at which a second mobile operator was introduced. Where available, performance for the four preceding years (to the left of 0) and following years (to the right of 0) is also shown. Overall the post-competition annual rate of increase of fixed line penetration rates is significantly

higher than the pre-competition rate, implying that particularly at the early stages mobile and fixed line are “complementary”.

Negative Impact on Network Investment

However, the impact of mobile competition on the level of network investment raises some concerns to policy makers. These relate to the challenges for fixed-line operators, already constrained by other challenges (unbalanced tariffs), with consequent negative impact on capacity for capital expenditure and the overall development of data and the Internet services.

Reference:

Vagliasindi, Maria (2004), “Telecom Reforms in Transition Economies: Progress and Challenges” Presentation for International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Chapter 5 Creating Independent Regulator

Competition and privatization in communications market will not produce positive impact without a creation of the independent regulator. What are the roles of independent regulator and how to create it?

Curriculum Topics:

- 5-1 What is independent regulation?
- 5-2 Why independent regulation?
- 5-3 Why is an Independent Regulator necessary?
- 5-4 What are the ingredients of effective design of independent regulatory framework?
- 5-5 What are the elements of proper market design at point of reform?
- 5-6 What are examples of presetting the regulatory framework?
- 5-7 Are ex-ante specialized ICT regulatory agencies necessary?
- 5-8 What are the necessary conditions for effective regulatory agencies?
- 5-9 How to ensure independence from line ministry?
- 5-10 What are the sufficient conditions to ensure independence? (1)
- 5-11 What are the sufficient conditions to ensure independence? (2)
- 5-12 What is the optimal structure of the Independent Regulator?
- 5-13 What is the EU requirement for the separation of regulator?
- 5-14 What tasks should be assigned to the Regulator?
- 5-15 Can independent regulation work in developing countries?

5-1 What is independent regulator?

Minimal definition is “The regulatory body is separate from, and not accountable to, any supplier of basic telecom services. The decisions of and procedures used by regulators shall be impartial with respect to all market participants.” (WTO Regulatory Reference Paper, Art. 5)

In actual fact, governments continue to play an important role on incumbent telecom operators in many countries as a major shareholder if not the sole shareholder. Therefore, many consider the WTO minimal definition to be inadequate. Clear separation of the policy setting function from that of regulation is seen as a requirement as well as

some level of insulation from the Minister responsible for the incumbent telecom operator. One could argue that the degree of separation from the major shareholder, even when that shareholder is the government, is called for by the WTO obligation.

Reference:

Samarajiva, Rohan (2004), “Universal Access Fund: How does it work? How to manage it?” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

5-2 Why independent regulation?

Attracting private investment requires a stable environment and credible assurances against outright or administrative expropriation.

Outright nationalization has become less concern

Outright expropriation or “nationalization,” which was so popular in the 1950s and 1960s, is no longer of great concern. Its costs are too high for most governments in the current economic environment. In any case, the risk of outright expropriation can be managed through well-crafted contracts, insurance and arbitration.

Administrative Expropriation

Administrative expropriation can occur through actions affecting the operation of the enterprise such as refusal to allow legitimate price increases, compulsion to invest in unprofitable areas or to purchase from specific suppliers associated with the government. Each of these actions reduces the ability to generate returns from investment and reduces the value of the investment. Taken individually, the actions may not appear significant, but cumulatively they can result in de facto expropriation of the investment. In contrast to outright expropriation, which is a single decisive event that results in the loss of ownership rights to the investment, administrative expropriation is a series of niggling actions that reduces the value of the investment gradually. The two processes are different, but the end result is similar.

Administrative expropriation is especially troublesome in infrastructure industries where investments are large and difficult to uproot and move once put in. Here, the investor’s negotiating position drastically weakens as soon as the investment is made.

Reference:

Samarajiva, Rohan (2004), “Universal Access Fund: How does it work? How to manage it?” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

5-3 Why is an Independent Regulator necessary?

An independent regulator with no affiliation to the incumbent operator is an important element of stability and objectivity in the market. It is reassuring to know that disputes or other issues between operators can be resolved objectively and transparently by someone who understands the telecoms business and is familiar with its complexities.

Legal Remedies against the Decisions of the licensing and regulatory authorities

The possibility to challenge the decisions of the licensing and/or the regulatory authority represents a fundamental right of a citizen. It is essential for the democratic function of any country to ensure that the decisions of administrative authorities, including the telecoms regulatory authority, are subject to a judicial review and thereby a judicial control on how administrative powers are exercised.

Penalties for Infringements

The regulatory environment in a country is clearly enhanced when penalties and other legal implications are laid down in a law and cannot be changed arbitrarily by a mere ministerial decree. Investors need to be made aware, not only what is permitted but also the consequences of breaking the law.

Reference:

Styliadou, Meni (2002), *The Building Blocks for Telecoms Reform - Legal Rules, Institutions and Culture*. Legal Transition, EBRD
<http://www.ebrd.com/country/sector/law/telecoms/about/building.pdf>

5-4 What are the ingredients of effective design of independent regulatory framework?

Independent Regulatory Framework should be designed addressing the following four aspects:

- Proper market design at point of reform
- Preset regulatory framework, reducing discretion as much as possible
- Provide for competent and adequately endowed regulatory agency
- Get proper leadership and staff

Reference:

Samarajiva, Rohan (2004), "Universal Access Fund: How does it work? How to manage it?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

5-5 What are the elements of proper market design at point of reform?

Market design must follow the axiom of 'competition wherever possible: regulation where necessary'. The optimal solution is to unbundle the integrated, government-owned monopoly in a way that clearly separates the essential facilities from the potentially competitive markets. This creates entry opportunities in the potentially competitive markets.

Remove/reduce entry/exit barriers as much as possible

Then the task is to ensure that the market power within the essential-facility segments is not extended into the competitive markets. This requires the design of effective access regimes and competitive safeguards.

Remedy Problems Caused by Essential Facilities and Nodes of Market Power

Where market power exists, regulatory measures, as light-handed as possible, must be taken to protect consumers. For example, asymmetric regulation that deregulates the prices of small, non-dominant operators is preferable to price regulation of all operators.

Pre-condition is unbundling policy, regulatory and operational functions

The separation of the policy, regulatory and operational functions is a pre-condition for the success of the market design. Telecommunication reform, to be successful, must occur at the government/Ministry level, at the level of the entity exercising regulatory powers and within the operator. It is now commonplace to say that modern management techniques must be applied to telecommunication operations and that suppliers of telecommunication services cannot be administered as government departments subject to political and bureaucratic interference. This necessitates separation of the operation function. This step has been taken in a majority of

countries. In the same way, there must be some degree of specialization in policy and regulation, which requires separation of these functions as well. Government must specialize in the broad policy functions of setting out the objectives and the parameters of activity within the sector. The regulatory agency must specialize in the implementation of the broad policy directives.

Reference:

Samarajiva, Rohan (2004), "Universal Access Fund: How does it work? How to manage it?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

5-6 What are examples of presetting the regulatory framework?

Especially in the early years as the regulator is getting established, there will be many challenges to its authority and competence. The best solution is to have most of the regulatory instruments pre-set, simple and easy to implement.

Interconnection Rules to Be Promulgated

For example, with interconnection, it is useful to have a complete and detailed set of rules, including default termination rates and interconnection points promulgated. The burden should be on the operator who does not like it (normally the incumbent) to object to it and propose alternatives.

Forget about price cap/revenue cap regulation of tariffs

Similarly, price regulation should be kept as simple as possible, too. It is advisable that complex tariff determinations that involve esoteric such as calculating cost of capital be avoided at least in the first few years. Best is the simple formula that has the buy-in of the operator, preferably obtained at the time of licensing. One particularly effective method tried out in Morocco was to get a new operator to bid on the components of a tariff formula as part of an auction for frequencies or licenses.

Regulator should be able to say, "I cannot do what you ask me to do"

Where Minister and others seek to interfere and influence, the regulator should be able to

say, “I cannot do what you wish”, not “I will not do what you wish.”

Reference:

Samarajiva, Rohan (2004), “Universal Access Fund: How does it work? How to manage it?” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

5-7 Are ex-ante specialized ICT regulatory agencies necessary?

While it may be possible to do without ex-ante specialized regulatory agencies and minimize even ex-ante roles in industries, such as port services, that is not the case with ICT infrastructure.

Not possible to write concession contracts that would address all contingencies

Long-term contracts or detailed licenses can provide a degree of protection for infrastructure industries against administrative expropriation. However, it is not possible to craft long-term contracts or licenses that cover all contingencies. As a result, some form of regulation, at least in the form of interpreting the general language of the contract in relation to specific situations, is required. Rapidly changing technological and market conditions as well as the complex interleaving of networks found in ICT infrastructures accentuates the necessity of ex-ante regulatory agencies, capable of devising new solutions, for the ICT sector.

Complexity and interleaving of ICT networks require some bespoke solutions

While the concession contract is desirable in countries with poor governance capacity, bespoke solutions are necessary in ICT sector. The point is to create a competent, independent regulatory agency in fact, not simply on paper.

Reference:

Samarajiva, Rohan (2004), “Universal Access Fund: How does it work? How to manage it?” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

5-8 What are the necessary conditions for effective regulatory agencies?

The necessary conditions include own funds raised through regulatory levies and accountability to Parliament rather than a Minister.

Own Fund, Financed Through Regulatory Levies

Theoretically general government funds are superior to taxes like payments levied from a particular industry, but in most developing countries this is the only realistic option in terms of operational autonomy. Generally in government, money comes with strings. To be funded by general taxation revenues is to be governed by regulations that apply to all parts of government. It is also to be subject to the uncertainty of annual budgetary allocations. In some cases, the Finance Ministry’s interest in influencing and/or punishing the national regulatory agency may affect the annual budget allocations.

Accountability to Parliament through Annual Report

In many cases, special procedures akin to those that apply to judicial appointments govern the appointment and removal of regulatory decision-makers (“members,” “commissioners,” “counsellors” or the Director-General). It is important that appointments to the top decision-making positions are made at a high level of government, not that of a Minister. The special procedures are intended to reduce the likelihood of bad appointments and to reduce the opportunities for undue influence by politicians.

Staggered Appointments of Members by Prime Minister with Concurrence of Constitutional Council

Decision-makers in a truly independent regulatory agency should not change with a change in political administration. Stability in the leadership of the agency can provide assurance to investors that their operating environment does not change with every change in government. Members of collegial decision-making bodies appointed by different political administrations can prevent covert actions to make the regulatory agency serve political interests. Staggered terms for the decision-makers allow for continuity as well as offer the

potential of bipartisan appointments in countries where political parties alternate in power.

Qualifications for Decision-Makers

The enabling statutes in many countries include qualifications for regulatory agency decision-makers. These can range from political-party affiliations (e.g., US) to expertise (e.g., Sri Lanka). Certain countries have minimum age requirements. In general, it may not be wise to over-specify qualifications because of the lack of qualified persons for these positions. For example, requiring expertise in telecommunication can result in the only qualified persons being those who have spent their careers in the former monopoly. If qualifications are attached, they are of little use unless verifiable. For example, a vague qualification such as “awareness of consumer affairs” is impossible to verify.

Removal Only for Cause by Parliament

Decision-makers cannot be immune from removal but removal must be difficult. Drawing from the US experience, it is possible to make a case for flexible appointment procedures coupled with rigid decision-making and removal procedures. For example, it is understood, and even expected, that regulatory appointees in the US will have had political affiliations. The safeguards for fair and independent decision-making are not provided by the personal histories of the appointees nor by their qualifications; they are provided by the requirements of the Administrative Procedures Act of 1946, the collegial form of decision-making that requires reasoning and persuasion by members, and by making it quite difficult to remove regulatory decision-makers without good reason.

Reference:

Samarajiva, Rohan (2004), “Universal Access Fund: How does it work? How to manage it?” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

5-9 How to ensure independence from line ministry? (1)

Regulatory agencies must to the extent possible be insulated from interference by

line ministries. The regulatory agency’s reporting relationship figures large in any discussion of independence. The specific form is affected by the specific conditions in a country.

Insulation from ‘line’ ministry, which tends to represent the partially reformed incumbent

In cases where the incumbent operator has not been reformed (corporatized or privatized) and continues to be the most important part of the sector, Ministry, having both the regulatory agency and the operator as part of the same Ministry, may be problematic. It may even be in violation of commitments a government has made to the WTO regulatory reference paper. However, it is important to ensure that the alternative reporting point is superior to the Ministry, in terms of independence.

Some safe-guard measures are necessary

Many governments retain the right to issue policy direction to the regulatory agency. It is best that some screens, such as approval by Cabinet, be erected to prevent undue influence by the Ministry.

Reference:

Samarajiva, Rohan (2004), “Universal Access Fund: How does it work? How to manage it?” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

5-10 What are the sufficient conditions to ensure independence?

People matter. The organizational structures within which people are placed matter. If independent regulation is to succeed, it is essential to break from the conventional government structures.

Flat Hierarchy, with Interdisciplinary Teams

Among the key ingredients are a relatively flat hierarchy, work done through interdisciplinary teams, and barriers to moving back and forth from the regulatory agency to the incumbent operator.

From Command-and-Control Mindset

Recruitment is extremely important as is induction to a new organizational culture.

This new culture must represent a clear discontinuity with the command-and-control mindsets common to conventional government organizations.

Compact Organization

Partly because the compensation packages will be high, it is important to keep the organization compact, staffing it mostly with professionals ready to undertake multiple tasks. The other reason is to avoid the condition of expending most organizational resources on internal problems to the neglect of the larger mission.

Reference:

Samarajiva, Rohan (2004), "Universal Access Fund: How does it work? How to manage it?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

5-11 What are the sufficient conditions to ensure independence? (2)

Effective regulation requires technical skills that must be learned and continually updated. The claim for legitimacy based on expertise requires the recruitment of qualified personnel, ongoing and high-quality training and the effective communication of these initiatives.

Adequate Compensation Packages and Training to Attract Persons with Skills and Potential

Adequate compensation is extremely important. All countries face the problem that the gap between regular government salaries in and what private-sector operators pay can be very large. Most governments hold regulatory personnel to standard government pay scales or at best to slightly higher scales. Training is a prerequisite for the expertise-based claim. Regulatory agencies facing the problem of low salaries may use the availability of training opportunities to attract good people at low salaries.

Openness to and Use of Outsourcing

Even in the largest and best-endowed regulatory agencies, but especially in the smaller agencies there must be openness to obtaining external expertise for specific projects. This allows for the effective

management of internal resources and also the continuous inflow of new ideas about international best practice.

Leadership Matters

But the key element is leadership that is confident, competent, courageous, communicative and committed. The new organizations that are being built as islands of good governance in an ocean of bad governance cannot be saved from reversion to the ocean unless the inhabitants are provided the right kind of leadership.

Reference:

Samarajiva, Rohan (2004), "Universal Access Fund: How does it work? How to manage it?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

5-12 What is the optimal structure of the Independent Regulator?

Creating an independent regulator from the scratch is not easy. As a result, the initial tendency of most countries has been to separate the Ministry from the operator and entrust the Ministry with the regulatory functions.

Separating the operator from the Ministry is not sufficient

However, it soon became clear that this was not a very "honest" approach since both the national operator and the regulatory department of the Ministry were usually headed by the same individual, the Minister of Telecommunications. New entrants have consistently expressed their concern whether this arrangement would provide the necessary safeguards of impartiality and objectivity.

Creation of a New Independent Body

In reply to these concerns, countries have gradually started creating independent bodies, separate from the Ministry of Telecommunications and from the operator, entrusted with all regulatory duties. However, policy decisions often remained the responsibility of the Ministry of Telecommunications, which occasionally was also responsible for the granting of licenses.

Government wants to maintain its power for licensing

This allocation of powers between the Ministry and the regulatory body often reflects a resistance to admit the unavoidable: during the decades since the invention of the telephone, governments and administrations have considered telephone as a strategic sector, the survival of which was ensured through the continuous support and care of the government. Some governments have thus decided to maintain the power to grant licenses and delegate the responsibility for enforcing the conditions attached to these licenses and ensuring market surveillance.

Reference:

Styliadou, Meni (2002) *The Building Blocks for Telecoms Reform - Legal Rules, Institutions and Culture*. Legal Transition Team, EBRD
<http://www.ebrd.com/country/sector/law/telecoms/about/building.pdf>

5-13 What is the EU requirement for the separation of regulator?

Legislation from the European Union required Member States to separate the regulatory responsibilities from the operational functions as early as 1990. However, it is only recently that this requirement was clarified and developed. Under recently adopted EU legislation, the independence of the national regulator can be guaranteed only if:

Independence from All Kinds of Operators

National regulatory authorities are legally distinct from, and functionally independent of, all organizations providing telecoms networks, equipment or services, and

Separation of Regulatory Functions from Operation

Member States that retain ownership or a significant degree of control of organizations providing telecoms networks and/or services ensure effective structural separation of the regulatory function from activities associated with ownership of control.

Need for Substantive Separation

The main message of this new legislation was to clarify that: (i) the regulator and the incumbent operator may not share personnel and/or facilities, and (ii) the telecoms regulator or any of its employees may not perform any tasks associated with the representation of the shareholders or the management of the incumbent operators. The need for this clarification arose from the fear that, despite a nominal separation, there were still strong links between the two organizations corroborated by a continuous transfer of personnel, ambiguity in the definition of tasks, and sharing of various facilities (for example scientific laboratories and measurement instruments).

Financial Independence

An additional element essential to ensure the independence of the regulatory authority is its financing. Interestingly, the nature of the business permits this authority to be self-financed if properly managed and organized. Frequency fees and license fees can ensure a continuous flow of capital and so permit the agency to be totally self-sustained and potentially profitable. The only problem is gain the political support needed to create such a genuinely independent, self-financed regulatory authority.

Reference:

Styliadou, Meni (2002) *The Building Blocks for Telecoms Reform - Legal Rules, Institutions and Culture*. Legal Transition Team, EBRD
<http://www.ebrd.com/country/sector/law/telecoms/about/building.pdf>

5-14 What tasks should be assigned to the Regulator?

As already mentioned, views do not always coincide on which tasks should be entrusted to the independent regulator. However, it is more or less universally accepted that the independent regulator should have responsibility for management of the frequency spectrum, the national numbering, the country's standardization policy, the overall market surveillance, and the enforcement of competition attached to the various licences.

Reference:

Styliadou, Meni (2002) *The Building Blocks for Telecoms Reform - Legal Rules, Institutions and Culture*. Legal Transition Team, EBRD
<http://www.ebrd.com/country/sector/law/telecoms/about/building.pdf>

5-15 Can independent regulation work in developing countries?

It is reasonable to be pessimistic about the prospect of effective regulation in the developing world. It is difficult to engender effective regulatory agencies from within dysfunctional governments.

Markets Characterized by Tight Oligopoly

Regulation is not about perfection. In a perfect world, regulation would not be necessary: the markets would be perfect and so would government. But what exists is an imperfect world where all markets are imperfect, in particular the markets in the ICT sector. For the foreseeable future, what are likely to exist are markets that are characterized by tight oligopoly; are rife with bottlenecks and essential facilities; and where oligopolists make continual efforts to extend market power from one segment to another.

Ensure not only that good outcomes are produced, but that the probability of bad outcomes, or regulatory risk is reduced

Government is far from perfect, but it will intervene when markets do not work. The performance of imperfect markets can be improved through government intervention; it can also be worsened. 'Good' government intervention, in the form of regulation that creates conditions of certainty, that is fair, and facilitates competition, can improve

performance. 'Bad' government intervention in the form of regulation that increases uncertainty, favors the incumbent, and hinders competitive forces, can exacerbate the imperfections of ICT infrastructure markets. The challenge in designing and operationalizing regulatory mechanisms is to ensure not only that good outcomes are produced, but that the probability of bad outcomes, or 'Regulatory risk' is reduced. The ethical principle of 'above all, do no harm' applies to policymakers and experts who design regulatory instruments and regulators, not only to physicians.

Independence requires continuous maintenance and reinforcement

Independence is the dike that enables the preservation of the island of good governance a regulatory agency is intended to be. But like any dike, independence requires continuous maintenance and reinforcement. In addition to formal safeguards for independent action by regulators, it is essential that regulatory agencies continually build and reinforce their legitimacy. Legitimacy can be achieved through effective communication of claims based on expertise, transparency and attention to the public interest. It is only by taking concrete steps to build and reinforce legitimacy on a day-to-day basis that regulatory agencies can engage in the accountable and effective governance essential for the satisfaction of the needs of current and potential users of ICT services.

Reference:

Samarajiva, Rohan (2004), "Universal Access Fund: How does it work? How to manage it?" Presentation at the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Chapter 6 Inter-Connection Arrangement

New entrant to the communication market cannot operate without connecting to the existing telephone networks. How to ensure a fair and equitable inter-connection arrangement between incumbent and new service providers?

Curriculum Topics:

- 6-1 What are the main WTO rules governing interconnection?
- 6-2 What additional interconnection rules have been established by the WTO?
- 6-3 What technical and operating conditions are required for efficient interconnection?
- 6-4 What technical and operating conditions are required for efficient interconnection?(2)
- 6-5 What are the key objectives of interconnection price regulation?
- 6-6 What are the main options for determining the costs of interconnection?
- 6-7 Why and how to benchmark interconnection tariffs?

6-1 What are the main WTO rules governing interconnection?

Interconnection

(Extract from WTO Telecommunications Reference Paper)

This section applies to linking with suppliers providing public telecommunications transport networks or services in order to allow the users of one supplier to communicate with users of another supplier and to access services provided by another supplier, where specific commitments are undertaken.

2.3 Public Availability of the Procedures for Interconnection Negotiations: The procedures applicable for interconnection to a major supplier will be made publicly available.

2.4 Transparency of Interconnection Arrangements: It is ensured that a major supplier will make publicly available either its interconnection agreements or a reference interconnection offer.

2.5 Interconnection: Dispute Settlement: A service supplier requesting interconnection with a major supplier will have recourse, either:

(a) at any time, or

(b) after a reasonable period of time which has been made publicly known to an independent domestic body, which may be a regulatory body, to resolve disputes regarding appropriate terms, conditions and rates for Interconnection within a reasonable period of time, to the extent that these have not been established previously.

Reference:

Intven, Hank (2004), "Basic Telecom Sector Reform Issues: Competition, Tariffs & Interconnection" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

6-2 What additional interconnection rules have been established by the WTO?

Interconnection with a major supplier will be ensured at any technically feasible point in the network. Such interconnection is provided:

(a) Upon request, at points in addition to the network termination points offered to the majority of users, subject to charges that reflect the cost of construction of necessary additional facilities.

(b) In a timely fashion on terms, conditions (including technical standards and specifications) and cost-oriented rates that are transparent, reasonable, having regard to economic feasibility.

(c) Sufficiently unbundled so that the supplier need not pay for network components or facilities that it does not require for the service to be provided.

(d) Under non-discriminatory terms, conditions (including technical standards and specifications) and rates and of a quality no less favourable than that provided for its own like services or for like services of non-affiliated service suppliers or for its subsidiaries or other affiliates.

Interconnection rights apply to all Service Suppliers, including wireless, local, national, international operators, etc.

Reference:

Intven, Hank (2004), "Basic Telecom Sector Reform Issues: Competition, Tariffs & Interconnection" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

6-3 What technical and operating conditions are required for efficient interconnection?

Provision of Information by Incumbents

Typically, regulators require incumbent operators to provide at least the following information to interconnecting operators: Standard Interconnection Agreements or Reference Interconnection Offers (RIOs); network specifications require for interconnection; and information on planned network changes.

Treatment of Competitive Information

Incumbent operators are normally required to accord confidential treatment to competitively sensitive information obtained from competitors (e.g. names and locations of new customers for whom interconnection is required). Such information is often kept confidential by means of: (1) Separate Carrier Service Groups; (2) mandatory codes of conduct for the incumbent employees; and (3) maintenance of separate files and records.

Points of Interconnection

Examples of technically feasible interconnection points are: Trunk side of local & tandem exchanges; Both sides of international gateway exchanges; Line side of local exchanges; Cross-connect points of any exchange; Agreed "meet points"; Signalling Transfer Points (STFs) for CCS7 & database connection for OSS & LNP.

Unbundling Network Elements

Some Possible Unbundled Elements include: Local Loops, Local & Tandem Switching, Inter-exchange Transport, Signalling Access, Call Database Access, Local Exchange Number Codes (NNXs), Telephone Directory Listings, Operator Services and OSS Functions.

Equal Access

In some markets, such as voice telephone markets, competitors normally require equal access to customers of the incumbent. Three main types of equal access are Call by Call Customer Selection, sometimes referred to as Casual selection and Operator Pre-selection. Operator pre-selection involves pre-programming of incumbent operator switches to route calls from specific customers to the competitor of their choice.

Reference:

Intven, Hank (2004), "Basic Telecom Sector Reform Issues: Competition, Tariffs & Interconnection" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

6-4 What technical and operating conditions are required for efficient interconnection? (2)

Sharing Infrastructure

Regulators frequently require sharing of certain network infrastructure in order to avoid duplication and increase overall network efficiency. Frequently shared infrastructure include: Poles, ducts/conduits, towers and Collocation of switching & transmission equipment in switching exchange buildings.

Quality of Interconnected Services

Regulators sometimes require incumbent operators to measure and report on certain standards to ensure they provide an adequate quality of interconnection services to

competitors. These may include Provisioning Measures, such as average provisioning time (e.g. for new circuits or local loops); Percentage of install appointments met; Comparisons of self-provisioning and competitor provisioning. More technical Switching and Transmission Quality Measures may also be required, such as Peak-hour blocking probabilities; Transmission delays and loss; and other service quality measures based on ITU-T recommendations or regional interconnection service benchmarks.

Reference:

Intven, Hank (2004), “Basic Telecom Sector Reform Issues: Competition, Tariffs & Interconnection” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

6-5 What are the key objectives of interconnection price regulation?

Prices should be published

Unless the incumbent operator publishes its prices for interconnection services, it will be difficult, if not impossible, for competitors to develop and finance a business plan and to start up service.

Prices should be unbundled

As specified by the WTO Reference Paper, prices for interconnection services should be sufficiently unbundled so that a competitive network operator need not pay for network components or facilities that it does not require for the service to be provided.

Prices should be non-discriminatory as between the incumbent & competitors

The WTO Reference Paper requires interconnection prices of incumbent operators to be non-discriminatory; that is, the rates should be no less favourable than those an incumbent provides for its own like services or for like services of non-affiliated service suppliers or for its subsidiaries or other affiliates.

Prices should be cost-based

This is perhaps the most difficult, generally accepted interconnection practice to implement. A number of different approaches have been used to develop costs of incumbent operators for interconnection purposes. These include full allocation of historical costs of the

operator among its services, and various approaches to developing the current costs of interconnection services. There is a broad consensus among telecommunications policy advisors that use of current costs will more closely match economically efficient costs, and therefore better promote network efficiency.

Reference:

Intven, Hank (2004), “Basic Telecom Sector Reform Issues: Competition, Tariffs & Interconnection” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

6-6 What are the main options for determining the costs of interconnection?

Historical (Book) Cost Allocations

This approach has been widely used, but also widely criticised by economists and competitors. The main criticism is that book costs often reflect operational or technological inefficiencies of an incumbent operator. Current technologies and operational techniques may be considerably cheaper than those of the incumbent operators. By using book costs, operators may be requiring competitors (and their customers) to pay for their inefficient technologies and or management practices.

Another criticism is that any book-cost-based approach will rely primarily on the incumbent operator’s data and accounting approaches, with little or no opportunity for independent verification. However, even where book costs are not used as the primary source of data for interconnection prices, they can be very useful to provide reconciliation with an economic costing model or benchmark costing study.

Current Cost Approaches

Forward-looking approaches use current price data and attempt to calculate the costs of an Efficient Network, rather than the historical costs of the incumbent’s existing network to provide interconnection services. The most common and generally-accepted approach is long-run incremental costs. Use of current costs to set interconnection prices will send the correct economic signals to promote the right investment decisions. For example, it will promote the entry of efficient competitors

and discourage the entry of inefficient (high-cost) entrants.

Long-Run Incremental Costs (LRIC)

Approaches

LRIC are the incremental costs that would arise in a long run with a defined increment to demand. The LRIC standard may be implemented either through “top-down” or “bottom-up” approaches. LRIC approaches have been implemented in a number of ways, including:

- (1) Total service long running incremental costs (TSLRIC),
- (2) The European Commission’s long run average incremental costs (LRAIC); and
- (3) The US FCC’s total element long run incremental costs (TELRIC).

These LRIC variations differ in terms of the size of the increment of service measured and the treatment of joint and common costs.

Reference:

Intven, Hank (2004), “Basic Telecom Sector Reform Issues: Competition, Tariffs & Interconnection” Presentation for International Seminar on ICT Policy Reform and Rural Communication Infrastructure

6-7 Why and how to benchmark interconnection tariffs?

A Good Transitional or Complementary Approach

It requires time and expertise to develop cost-based approaches to determining interconnection tariffs. It also sometimes requires several iterations or reviews to develop refine a costing study to the point where it can provide a reliable basis for setting

interconnection tariffs. In the meantime, it is a good practice to compare or Benchmark national interconnection tariffs with prices in other countries with competitive markets or where regulator has established prices based on an acceptable costing approach.

Several countries have adopted benchmarking as a complementary methodology (e.g. European Union best practice interconnection tariffs).

Develop Detailed Comparison Methodology

- (1) Verify similarities with benchmarked countries
- (2) Adjust for differences
 - Economic differences: Variations in national socio-economic situations can require major adjustments (e.g. to cost of capital, which can vary significantly, especially in high-risk markets).
 - Types of interconnection: Different types and levels of interconnection (e.g. regional termination tariffs, single and double transit arrangements)
 - Added charges: Adjust for universal service or access deficit charges (ADCs) embedded in interconnection charges
 - Tariff charging regimes: Adjust for different tariff charging regimes (e.g. Calling Party Pays CPP and Receiving Party Pays RPP)
 - Tariff structures: Adjust for different structure of tariffs (e.g. call set-up charges, peak/off-peak charges)

Reference:

Intven, Hank (2004), “Basic Telecom Sector Reform Issues: Competition, Tariffs & Interconnection” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Chapter 7 Tariff Reform

Pre-condition for competition and privatization of communication market is the introduction of cost-based tariff system. Why is it necessary? And what are the steps for tariff reform?

Curriculum Topics:

- 7-1 When should tariffs be regulated?
- 7-2 What are the most common types of traditional tariff regulation?
- 7-3 What is Price Cap Regulation, and what are its advantages?
- 7-4 Why is Rebalancing of Tariffs necessary?
- 7-5 Rate Rebalancing - the most challenging policy issue?

7-1 When should tariffs be regulated?

In monopoly markets, most tariffs are regulated to prevent abuse of dominance

Governments or regulators traditionally regulated all or many of the tariffs for telecommunications services provided under monopoly conditions. This applied to monopoly markets with state-owned telecom operators (e.g. in Europe) as well as privately-owned operators (e.g. in North America). Monopoly operators were frequently prohibited from changing the tariffs for any of their services without obtaining prior governmental or regulatory approval. The reason for such regulation was the recognition that monopoly power could be abused, to the detriment of consumers (e.g. by setting prices well above costs and earning super-normal profits).

Effectively competitive markets do not require price regulation

As telecommunications markets were privatized and as they became more competitive over the past two decades, more and more tariffs were deregulated. It is generally accepted that when markets for telecommunications services (or any other goods or services) are provided in markets where there is effective competition between operators, there is no need for regulation of the prices of such competitive services. For example, mobile telecommunications services of most types have been unregulated in many

markets for years. So have prices for many value-added services.

Dominant providers are normally regulated

In competitive telecommunications markets, price regulation generally applies to dominant service providers only. Dominance is defined in the economic literature and legal decisions as the power to make ongoing changes in the prices and conditions of service in a market without constraint from competitors or customers. A dominant firm can abuse its market position in much the same way as a monopoly. However, incumbent operators and other firms may be dominant in some markets (where they should be price-regulated) and not dominant in others, where they should normally be deregulated. There is usually no need to be regulated the prices of new entrants with no market dominance, even where the prices of the same services provided by a dominant incumbent are regulated.

Reference:

Intven, Hank (2004), "Basic Telecom Sector Reform Issues: Competition, Tariffs & Interconnection" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

7-2 What are the most common types of traditional tariff regulation?

Discretionary Price Setting

Traditionally, in many countries, price regulation focussed on social objectives as much or more than financial or economic ones. This was particularly true where the government operated the telecommunications network. Under such circumstances, prices were usually set to promote equity between consumers. In many countries, there was little or no analysis of the economic impacts of such policies.

The stated objective of this type of pricing is to promote affordability of basic telephone services, and to set tariffs at levels higher than costs for businesses and consumers who value service highly and can afford to pay. Often the government or the Minister in charge would micro-manage a state-owned operator's pricing structure, reducing its ability to function as a normal business enterprise. In some jurisdictions, telephone revenues of state-owned operators were treated as part of general government revenues. This arrangement often deprived the operator of the capital required to upgrade its network, introduce advanced services or compete effectively. Experience has shown that discretionary price setting approaches seldom achieved their social or economic goals, at least on a long-term basis.

Cost-Based (Rate-of-Return) Regulation

Under traditional ROR regulation, first, the regulated operator's revenue requirement is calculated. Then the operator's individual service prices are adjusted so that its aggregate service revenues are sufficient to cover its revenue requirement.

In calculating the revenue requirement, the regulator first reviews the operating costs and financing (e.g. debt service) costs. Typically there is some regulatory scrutiny to ensure that the costs were necessarily incurred in order to provide the regulated services. If not, they may be disallowed from the Rate Base. The operator will not be entitled to increase its prices or rates to recover such disallowed costs. The next step in calculating an operator's revenue requirement is to determine its rate of return. In order to allow the operator to remain financially viable, and to attract new capital for its operations, ROR regulation permits the operator to recover not only its direct operation and financing costs, but also a fair return on its rate base.

The regulator determines an appropriate rate of return on capital for a given time period (typically 1 to 3 years). This return is generally based on a review of financial market conditions, plus any additional operator or industry-specific issues (industry or operator risk, operator specific taxation issues, etc.).

Based on the approved rate of return, a revenue requirement is calculated (i.e. total revenues that may be generated in a given period). The revenue requirement is to be recovered from the sum of all services provided. If an operator earns more than its allowable rate of return, the regulator will require price reductions to bring the operator's rate of return down to the allowable level. Conversely, if the operator does not meet its allowable rate of return, it will request price increases to raise its revenues.

Reference:

Intven, Hank (2004), "Basic Telecom Sector Reform Issues: Competition, Tariffs & Interconnection" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

7-3 What is Price Cap Regulation, and what are its advantages?

Use of a formula to adjust prices

Price cap regulation uses a formula to determine the maximum allowable price increases for a regulated operator's services for a specified number of years. The formula is designed to permit an operator to recover its unavoidable cost increases (e.g. inflation, tax increases, etc.) through price increases. However, unlike ROR regulation, the formula does not permit the operator to increase rates to recover all costs. The formula also requires the operator to lower its prices regularly to reflect productivity increases that an efficient operator would be expected to experience.

$$\begin{aligned} &\text{Allowable Price Increase for a Year} \\ &= \text{Starting Price} + I \text{ (Inflation Factor)} \\ &- X \text{ (Productivity Factor)} \end{aligned}$$

Suppose in the year 2004, the price is 100; $I=5$; $X=3$. Then the allowable price increase for 2005 equals $100+5-3=102$. Operators may increase prices to include the effects of inflation, i.e. 5%. However, the example also

assumes that telecommunications industry productivity will increase by 3%. Such productivity increases result from technological improvements, lower switching and transmission costs, and many other factors. Therefore, in the above example, the operator must pass on a productivity benefit to its customers by lowering its year 2005 prices by 3%. In this example, the operator may reap the benefits of any reduction in its costs below 3%. If the operator has been very efficient, it may have reduced its actual costs by 10%, rather than 3%. The additional earnings that result from such efficient operations may be retained as profits to shareholders or used for other purposes, such as new investment. The price cap formula determines the maximum required price decreases.

There are two major advantages in price cap regulation: (i) Greater incentives for efficient operation, while protecting consumers; and (ii) Less regulation and greater pricing flexibility to meet competition. Also, the other advantages include: (iii) Consumers and operators share in expected productivity gains; and (iv) There are limited opportunities for cross-subsidization.

Price cap regulation is meant to provide incentives that are similar to competitive market forces. Competitive forces require operators to improve productivity and, after accounting for unavoidable increases in their input costs, pass these gains on to their customers in the form of lower prices. The price cap formula has a similar effect.

Reference:

Intven, Hank (2004), "Basic Telecom Sector Reform Issues: Competition, Tariffs & Interconnection" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

7-4 Why is Rebalancing of Tariffs necessary?

National authorities are strongly advised to guide the telecoms operators towards a cost-oriented tariff policy whereby prices for the various services reflect the real cost of these services.

Cross-Subsidy has been prevalent

As mentioned above, most operators around the globe have been subsidizing local voice telephony with revenues generated in the most profitable segments of the market, such as international and long-distance services. As a result of this policy, incumbent operators are exposed to the risk of finding themselves in a very uncomfortable position when some or all telecoms services are liberalized.

Consequence of Liberalization

New entrant will obviously try to penetrate the most profitable segments of the market and undercut the inflated prices of the incumbent. By doing so, they will undermine seriously the incumbent operator's profitability as well as its financial ability to subsidize local voice telephony or other unprofitable services. The incumbent will then probably try to compensate for its losses by requesting the intervention of the universal service mechanism.

Subsidies should go to the most disadvantaged areas

However, not all unprofitable services deserve subsidies from the universal service mechanism; the objective of the mechanism is to permit the establishment of networks in the poorer and most remote of the country and not to correct the imperfections of the incumbent's tariff policy. In other words, it is highly unlikely that the expansion and upgrading of the network which the country's capital or major crisis needs to be subsidized.

Investors do not like to invest in companies dependent on subsidies

Apart from its obvious distorting effects on the development of the market, this unbalanced tariff policy has a particularly adverse effect on ensuring private financing. Private financiers are reluctant to invest in a business whose future is likely to be dependent on subsidies.

Rebalancing takes long time

On the other hand, rebalancing of tariffs cannot happen overnight; it is a socially and politically sensitive issue and can only be achieved gradually over an extended period. This is why it is highly recommended that the process is started as early as possible, even before any form of liberalization has taken place.

Reference:

Styliadou, Meni (2002) *The Building Blocks for Telecoms Reform - Legal Rules, Institutions and Culture*. Legal Transition Team, EBRD
<http://www.ebrd.com/country/sector/law/telecoms/about/building.pdf>

7-5 Rate Rebalancing: The Most Challenging Policy Issue?

Rate Rebalancing: A Monopolistic Legacy

'Rebalancing' refers to moving the prices for different telecommunications services more closely in line with the costs of providing each service. In most monopoly markets, telecommunications price structures were highly unbalanced, with some services priced well above costs and others below costs. Prices of telephone connections, monthly subscriptions, and local calls have traditionally been set below costs in many countries. Resulting deficits have been subsidized by higher-than-cost long distance and international calling prices.

Unbalanced Rates: Not Sustainable in a Competitive Environment

Unbalanced price structures are not sustainable in a competitive environment. It can bankrupt an incumbent. New competitors will generally enter those market segments where profit margins are highest, such as long distance and international calling. Incumbent operators must reduce subsidies or risk losing customers in the more profitable market segments. Higher-than-cost prices encourage uneconomic entry by high-cost operators. Lower-than-cost prices discourage economic entry, even by low-cost operators. Rate rebalancing increases market efficiency.

Short-term Pain for Long-Term Gain

A significant amount of rate rebalancing has occurred in many industrialized countries. Comprehensive price comparisons have been conducted by the OECD for its 29 member countries since 1990. Local tariffs have risen by more than 30%; long distance tariffs have decreased by about 30% over the same period. Overall teledensity in the OECD countries increased steadily, despite rebalancing. Rate rebalancing produced lower overall prices for most consumers in a majority of the countries surveyed. (See Intven ed. 2000, Module 4 and Appendix for details)

Mitigate the Pain: Social Rate Structures and Targeted Subsidies

Rate rebalancing can reduce cross-subsidies that support low local access rates and services to high cost rural areas. However, rich customers do not require the cross-subsidy for their local tariffs. The standard response is to mitigate social and political impacts of rate rebalancing on poor and rural areas through socially targeted rate structures (e.g. low lifeline rates with low monthly limits), universal service funds and least-cost auctions for rural network expansion programs.

Reference:

Intven, Hank ed. (2000), *Telecommunications Regulation Handbook*, The World Bank, Nov. 2000

Intven, Hank (2004), "Basic Telecom Sector Reform Issues: Competition, Tariffs & Interconnection" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Chapter 8 Legal Framework for Telecommunication Reform

An effective legal and regulatory framework is essential to attract the necessary private investment into the telecom sector of most transition countries and to ensure that those countries have the best chance of harnessing the benefits for the country that flow from a competitive telecommunications sector and all that this has to offer in terms of integration into the global “information society”.

This is particularly so where, as is currently the case, there is increasing demand for limited capital investment resources and potential investors have a wide range of sector opportunities to choose from globally in both transition and developed nations. In such circumstances potential investors will look to where their concerns are best met.

Curriculum Topics:

- 8-1 What are the investor concerns that a legal framework should address?
- 8-2 How to make government policy clear and coherent?
- 8-3 What issues should Primary Legislation address?
- 8-4 How to create a solid Institutional Foundation
- 8-5 What is the appropriate accountability for a regulator?
- 8-6 How to make a transparent licensing process

8-1 What are investor concerns that the legal framework should address?

- Transparency
- Lack of Independent Regulator
- Unclear and Harsh Legal and Regulatory Environment
- Absence of Controls on Anti-Competitive Conduct
- Property Rights, including Intellectual Property

Reference:

Moffatt, Paul (2004), “Legal Framework to Support ICT Reform” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

8-2 How to make government policy clear and coherent?

In order to mitigate investors’ concern over the transparency and uncertainty of the

government policies, policy on telecommunication sector should be based upon the following principles:

Send Clear Signals

Sector policy should send clear signals with respect to the development of the sector. Government sector policy effectively sets out the government’s objectives, intentions and methodology for the medium- to long-term in the telecommunications sector. The policy should cover all. Accordingly, sector policy should cover all main sector areas, such as liberalisation, plans for private participation in the sector, tariff reform, interconnection, universal access, etc. Sector policy should cover these issues in broad form but with sufficient detail to allow sector participants (or potential participants) to make decisions to continue within (or enter into the marketplace).

Sector policy is a place for broad, yet clear and certain, intentions to be articulated. These

broad intentions can then be detailed in specific regulations, necessary for practical implementation broader policy intentions. An example would be tariffing: Sector policy should generally set out the principles and methodology by which sector tariffs are to be set and implemented (i.e. cost-based, allowing for a reasonable return on investment). Tariff regulations, adopted by the sector regulator (or Ministry), will then detail the tariff setting mechanism and set out a time frame within which the adjustment of the tariffs to their cost base should be achieved

Obligate the Government

While sector policy documents are not binding legal documents in most countries, they can, once in the public domain, impose certain obligations upon government to act in accordance with their declared intentions with respect to particular issues.

Create Political Pressure

Where properly constructed and published, sector policy documents can add political pressure to pursue the development of a particular sector.

Set Easily Identifiable Form

In essence, a policy should outline key sector objectives in broad, clear, certain and easily identifiable form. Policy should further identify the parties responsible for implementation of specific objectives, the means by which these objectives are to be achieved and provide a timetable within which the objectives should be achieved. Ideally, the policy should also be accompanied by an Action Plan specifying individual elements of policy and identifying specific steps and an appropriate timeline preparation and implementation of individual elements of policy.

Guide the Market to Optimal Competitive State

Sector policy is effectively a roadmap for the sector in its transition from a state-owned monopolistic environment to a privatized and liberalized cost-based model. Accordingly, sector policy should act as clear guidance for the marketplace to its optimum (competitive) state, while providing for achievement of social objectives such as universal access.

Reference:

Moffatt, Paul (2004), "Legal Framework to Support ICT Reform" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

8-3 What issues should primary legislation address?

Once broad sector policy has been decided upon, the intentions contained in the policy document need to be translated into concrete actions and a legislative framework within which these intentions can be given life. This legislative framework is underpinned by a framework telecommunications law which is necessary to entrench the core principles attaching to the sector, e.g. transparency, non-discrimination, objectivity, promotion of competition, etc. Generally speaking, framework telecom legislation will be prepared by the responsible ministry (in consultation with the sector regulator) and presented to the parliament which will debate and pass this primary legislation as a law of parliament. Such primary legislation should address the following issues:

Statement of Rights and Obligations

Primary legislation should provide a clear and concise statement of rights and obligations of all sector stakeholders.

Sector Principles, Such as Liberalization

Fundamental incontrovertible sector principles (as above) should be contained in primary legislation. Detailed procedures applicable to individual elements of the sector should then be contained in secondary legislation. Such practice allows entrenchment of fundamental principles that will be unlikely to change in primary legislation, while allowing the practical day-to-day operational and implementation issues that may be affected by changes in technology or operation of the marketplace be included in Regulations which can be more easily altered to reflect changing technology or marketplace.

Quality of Entrenchment and Permanence to Critical Elements

Once enacted as primary legislation by the parliament, amendment is a lengthy and cumbersome exercise in the majority of countries. Thus, though primary legislation does not cast principles in stone, never to be

changed, the quasi-permanence allowed by the characteristics of primary legislation can protect them from political tinkering or short-term alteration; Even where democratic credentials of parliaments in certain countries may not be as solid as they could be, the process attached to amendment of parliamentary legislation nonetheless acts as a solidification of basic principles.

Actual content of primary legislation will vary

Actual content and level of detail of primary legislation will vary from country to country. In this respect, much will depend upon the level of development of the market place, the strength of the surrounding administrative structure and the effectiveness of the underlying legal environment. Where these elements are sufficiently advanced, the amount of specificity required in primary legislation is reduced. Where sector reform has yet to begin or where the application of modern regulatory standards is in its infancy, more specific guidance of the law will be necessary. Similarly, where the legal environment, in particular the court administration, is not yet used to dealing with complex econo-legal matters, more detail will be necessary.

Reference:

Moffatt, Paul (2004), "Legal Framework to Support ICT Reform" Presentation for International Seminar on ICT Policy Reform and Rural Communication Infrastructure

8-4 How to create a solid Institutional Foundation?

To implement the various reforms and initiatives contained in primary telecom legislation a strong institutional foundation should be established based on the clear separation of the following functions:

Separation of Telecom Operations from Post, Broadcasting and Other Functions

In the traditional state-owned monopolistic regime, telecom sector administration was usually mixed with postal and broadcasting operations. Among other things, this made the separation of the cost between these operations very difficult and often led to cross-subsidisation of profit-making operations with loss-making areas. While in a

number of countries the same institution (i.e. sector regulator) is responsible for regulation of the post, telecoms and broadcasting (e.g. Ofcom in UK) the commercial operations should be separated from each other and from regulatory function, and, ideally commercialized and corporatized to allow functioning in a modern commercial environment. Commercialization and corporatization are two fundamental steps towards privatization of state-owned incumbent telecom operators. Accordingly, modern institutional framework should separate those functions clearly, allowing for the allocation of cost and allowing for the commercialization and corporatization of differing operations.

Separation of State Ownership from Regulation

As indicated above, in the traditional state-owned monopolistic regime, telecom sector administration provided for a government ministry to perform the function of both regulator and operator. A key element of a stable environment for telecoms is the establishment of an independent sector-specific regulatory authority. With the onset of modern telecom practices and movement toward a market economy, as promoted by the EU and WTO, regulation by a government ministry making decisions about policy formulation, implementation and network operation is clearly inappropriate. The key sector reform initiatives of privatization and liberalization have created a new market dynamic necessitating separation of these functions a more transparent and accountable method of regulating the sector. The now widespread EU/WTO-style sector-specific regulatory authority, independent of both political and operational influence, has emerged as the *sine qua non* of sector reform. Such separation of ownership and regulatory functions increases perceived neutrality and insulation of the regulator from political pressure and investors will generally have greater confidence that such a regulatory authority will regulate in a transparent and objective manner. Accordingly, where the government retains any shareholding in an operator, the regulatory function should be clearly separated from the control function of the operator as the shareholder. A common model for addressing this issue of operational control is to transfer the state shareholding from the ministry responsible for the telecom

sector to the Ministry for Finance or a state property/privatisation agency.

Separation of Policy-making from Regulation

The government function as the policy maker to design the rules of reform of and competition in the telecom sector. Implementation of these more appropriately lies with an independent regulatory agency, separate from the Ministry. Such separation generally allows efficient, objective and transparent implementation of sector regulation, free from most of the political pressures that dictate policy formulation.

The role of an independent regulator is to provide ways of ensuring that competition can emerge in ways which are well adapted to the needs of the sector, and which should enable it to develop without the necessity for individual action by market participants to establish entitlements. As with the regulatory regime itself, clear rules and processes must also apply to the regulatory function and the regulatory authority, as well as the basic procedures that will govern its interaction with the marketplace must be defined, preferably in primary legislation. Crucial also for any reform endeavour in this respect is the ability to develop a flexible regulatory capacity that can adapt to an ever-evolving marketplace and that will take every opportunity to promote and enhance competition in pursuit of the both social and commercial objectives.

Reference:

Moffatt, Paul (2004), "Legal Framework to Support ICT Reform" Presentation for International Seminar on ICT Policy Reform and Rural Communication Infrastructure

8-5 What is the appropriate means of ensuring accountability of the regulator?

Parliamentary Oversight and Judicial Review

Parliamentary oversight exercised through appointment by the parliament of the board and chairperson of the institutions charged with implementation, administration and enforcement of the legal and regulatory framework for the sector.

Dismissal of Regulators

Similarly, the parliament should have the power to dismiss such official in the strict circumstances provided for in law, through the exercise of procedures also set out in law.

Judicial Review

Judicial review comes from the scope of the courts to review decisions of the sector institutions (i.e. the independent regulator) where such decisions appear unreasonable or exceeded authority possessed by the institution.

Reference:

Moffatt, Paul (2004), "Legal Framework to Support ICT Reform" Presentation for International Seminar on ICT Policy Reform and Rural Communication Infrastructure

8-6 How to make licensing process transparent?

Licensing is a critical component of the reform process in many economic sectors. This is particularly the case in the telecom sector, where licences provide certainty for and boost confidence of sector investors. In the introduction of liberalization and a competitive marketplace, licensing has been a primary means of market entry for new operators interested in providing facilities or service-based competition.

Clear Licensing Policy

Licensing policy & market structure should provide all market participants (or potential participants) with a clear idea of the opportunities on offer and the rights and obligations attaching to available opportunities. Accordingly, such policy should be clearly stated, identifying the areas of the sector open or to be opened for market entry, a specific timetable for implementation of policy and a clear statement of the types of licences to be issued, together with the rights and obligations attaching thereto. As with primary framework legislation in the telecom sector, the depth and specificity of the licences on offer will depend upon the level of development of the marketplace, the strength of the surrounding administrative structure and the effectiveness of the underlying legal environment. Where these elements and the related regulatory structure are developed, less detail will usually be necessary as many of the necessary rights and obligations are contained

in sector laws and regulations anyway and the licence activates those rights and obligations in favour of the licensee. Conversely, where these elements are not sufficiently developed fairly comprehensive licences are sometimes an advisable way of achieving the regulatory certainty that investors seek in critical areas such as anti-competitive safeguards, interconnection rights, tariffing, dispute resolution, etc.)

International Trend to General Authorizations

In the telecom context, licensing in general refers to authorizations granted to operators to provide telecom-based services. A licence itself generally refers to a legal document setting out the rights and obligations of a licensee relating to the provision of service. As a market matures and competition develops, the trend is towards less onerous licensing requirements and the formal licensing issuing occurring in situations where operations are accompanied by the use of scarce natural resources (such as radio frequency spectrum). In such circumstances, other categories of telecom provision are covered by “general authorizations” a general category of authorizations applying standard rights and obligations upon registration of a licensable operator with the sector regulator.

Specific licensing rules & transparent licensing mechanisms must be applied

As with the descriptions of the other essential elements of a legal and regulatory framework

above, a critical element of licensing is a clear and transparent licensing process which allows all sector stakeholders to be aware in advance of the requirements for grant, continuation and revocation or cancellation of a given licence. In addition to a transparent mechanism, administration of the mechanism must be fair, non-discriminatory and objective.

Clear Rules for Allocation of Scarce Resources

Similarly, clear and transparent rules for the allocation of radio spectrum are essential, allowing fair and transparent competition for available radio spectrum resources.

Regulator to Enforce Compliance with Licence Conditions

Without adequate expertise, financial and human resources for the regulatory authority with which to enforce compliance with licensing conditions, a given licensing mechanism will not be meaningful.

Reference:

Moffatt, Paul (2004), “Legal Framework to Support ICT Reform” Presentation for International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Part III Universal Access

Universal Access	
Question 13. Universal Access Obligations	
What is the government policy on Universal Access obligations?	
Level 1	State monopoly telecoms operator has a legal universal access obligation, but it is not successfully implementing this obligation.
Level 2	The government has introduced a competition in the telecoms market, but there is no regulatory mechanism to ensure universal access to all the people.
Level 3	The government has introduced a universal access obligation to the incumbent telecoms service operators either through contributing to the Universal access fund or providing an inter-connection agreement with rural telecoms operators with lower fees.
Level 4	The government has established a universal access fund and has implemented a competitive tender to grant licenses to rural telecoms operators.
Level 5	The government has a comprehensive policy to develop rural communication infrastructure using universal access fund, including rural telecoms services, Internet service providers, community telecenters, etc.

Chapter 9 Rural Connectivity

Rural connectivity requires a backbone transmission lines and a technologies to connect to individual end users. Technologies include wireless local loops, cellular phones, and satellites. What are the characteristics of each technology? What are the best choices for different situations?

Curriculum Topics:

- 9-1 Why is viability a challenge? Why are rural communications traditionally thought of as unviable?
- 9-2 What is viability?
- 9-3 How much do rural people want communications and how much will they pay?
- 9-4 Is technology bridging the digital divide?
- 9-5 How do mobile operators meet and eclipse regulators' vision for universal service?
- 9-6 What are the limits of viability and where is universal access intervention required?
- 9-7 Universal Access intervention - What is the access gap?
- 9-8 What kind of incentives and subsidies are required?
- 9-9 What information services do rural and low-income people need and demand?
- 9-10 What form of Internet & ICT service is viable?
- 9-11 What is Ouput-Based Aid?

9-1 Why is viability a challenge? Why are rural communications traditionally thought of as unviable?

History of Social Obligations

Until the monopolistic mould was broken, one of the most common statements about rural communications was, "Rural services are costly to provide and revenues don't meet costs," or "We have an obligation to provide universal service or universal access and it's a burden." The logic was that incumbents could only meet the burden through retaining unbalanced tariffs and protecting their domestic monopolies. In most emerging markets and developing countries, they retained their so-called protections--- unbalanced tariffs, excessive profits from long distance and international calls, and exclusivity rights --- but still they did not serve rural areas adequately, while their assumptions about rural network economics

were inadequate and they under-estimated the potential for profitable service.

View of Rural People

Sadly, even though most urbanites, senior managers and politicians have family routes in rural communities, they did not appreciate the economic implications of the need to communicate. "Rural people can't afford to pay," "We have to keep tariffs low," "We'll lose money," "Technology is too rich-country oriented and costs too much," were the excuses. Of course, the story was a negative one and self-fulfilling.

Seeds of Change

Many studies estimated that the consumer surplus derived from use of the phone was many times as large as the price paid for the service. This meant that, given the chance, people could, in fact, afford to pay more for a good level of service. However, policy-makers and regulators did not act on this insight but insisted on low tariffs. So rural people

continued to receive very poor fixed-line service, or no service at all, at a low, subsidized price. When payphones were installed, they often fell into disrepair almost immediately, were poorly maintained, and the poor service continued.

Lack of Good Accounting and Understanding of Incoming Revenues

Even payphones would receive a surprising number of calls, which someone would answer and pass on messages resulting in incoming calls. Sometimes, a person minding the phone would make a business out of passing messages. Or where it was allowed, village people would go to the phone, make a brief call to their relatives and then stand by for a call back. Incumbents often preferred to ignore this, while some operators would ban such practices or not publish the numbers! They couldn't be bothered that there was substantial incremental revenue to be gained from rural phones, which would make them more viable. They could have taken the step of deploying phones in a manner which developed this market, but they normally chose not to. But time passed and events have overtaken them, happily.

Things are no longer so bleak; how did this situation begin to change?

De-regulation, the start of the modern 'universal access fund movement' and the mobile explosion have brought new concepts which together have changed the environment. It didn't come from a grand global or regional rural communications strategy, or from a new 'developing country technology design'. It came as a by-product of the private sector entry into the mobile market.

Reference:

Dymond, Andrew (2004a), "Challenges in Creating Viable Rural Connectivity Models in Developing Countries" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

9-2 What is viability?

Profitable Service Provision

We need to start here although so many would start with other concepts of sustainability. While they are important, as we shall see, so many others have not appreciated that profitability is the bottom line for viability.

Operational and Cultural Sustainability

Of course, without this, there is no viable market. Regulators especially need to take note. It is noteworthy that in the least developed continent, Africa, some regulators are embracing the need to regulate for the market and for the people, not for the sake of political control. In Uganda and Nigeria in particular, two of the countries that have seen the most rapid transformation in the last 3-5 years, the regulators appreciate that less regulation may bring more benefit and transformation, especially into rural areas. For example, the Ugandan Communications Commission (UCC) and Nigeria Communications Commission (NCC) have understood that protecting traditional fixed payphone interests may bring no benefit at all, whereas encouraging a free market for resale of airtime by local entrepreneurs may spawn many kinds of new developments, new markets and universal access.

What rate should operators expect from rural operations?

If urban markets provide 30% + IRR and 3 years payback (or better), rural should still probably be expected to provide 25% IRR and 5 years payback at least.

Reference:

Dymond, Andrew (2004a), "Challenges in Creating Viable Rural Connectivity Models in Developing Countries" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

9-3 How much do rural people want communications, and how much will they pay?

New Expenditure Pattern

ITU Annual Statistics showed a world average of around 2% for many years up until year 2000. The amount was recognized to depend on factors such as growth of service and information sectors, dependence on trade, transportation routes, etc. e.g. higher income, remittance based on island economies usually spent more, the latter largely because of the cost of international calling and of the alternative, transportation.

Average Expenditure level has gone from 2% to 5% in many countries, e.g. South Africa,

Uganda, Nigeria, and Mongolia. Even in Russia, in small rural localities inhabited by older people and with little economic activity, recent studies by Intelecon have identified a desire to communicate and an additional market for incoming calls.

Reference:

Dymond, Andrew (2004a), "Challenges in Creating Viable Rural Connectivity Models in Developing Countries" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

9-4 Is technology bridging the digital divide?

Yes and No. There is no new frontier technology or magic bullet arrived. Telecenters have also been too cumbersome and unviable to offer a widely applicable Internet solution in all but a few countries.

But the mobile revolution has spilled over into rural Areas. Most European countries have achieved near total coverage. Densely populated emerging markets in Latin America and Asia are not so far behind. Even large and sparsely populated countries such as Russia are becoming surprisingly reachable. In developing countries, including African ones, mobile is the best hope for universal access and is the most desirable for the populous from the demand perspective.

The keys, however, were de-regulation, economy of scale, commercial innovation, pricing and people power. Mobile companies generally under-estimated the extent of demand in developing countries, but were driven by a combination of exploding pent-up demand, competition and profitability to expand their networks very rapidly. In the majority of developing countries, mobile customers now outnumber fixed lines by a significant margin.

Reference:

Dymond, Andrew (2004a), "Challenges in Creating Viable Rural Connectivity Models in Developing Countries" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

9-5 How do mobile operators meet and eclipse regulators' vision for universal service?

Liberalization and entrepreneurial innovation has been key

It is higher tariffs, not lower ones, mixed with innovative pricing, such as flat national call rates, that have made the difference, not enforced low tariffs. Higher interconnection (incoming terminating) rates for mobile operators have provided incentive for them to invest beyond where they might have reached otherwise and to maintain competitive retail rates.

Network Economics: Infrastructure and Handsets

Handset costs have plummeted to allow many people to enter the market for less than \$100, while the pressure of expanding networks into lower income areas are giving rise to a supplier market offering low-cost base stations, innovative network design and packaging (e.g. combining low capacity base stations with small mobile switches for regional area deployment).

Many of the objectives set by policy-makers and regulators for universal service and universal access are being met

E.g. 60% of the small proportion of households still unreached by fixed line service in the UK were already mobile customers when the regulator studied the market; in Russia 30% of unserved localities listed as a universal service target of needing one payphone already have mobile service customers; Uganda's universal access target of at least one public access phone per rural sub county has already been surpassed by the mobile operators in more than 85% of cases nationally. This is being repeated over again and changes by the day.

Pro-Poor Angle

What do the poor want above all? They want to have access to communications, just like the rich. Until recently, nobody knew how they would react and how they would value telecommunications. The great equalizer is information, and the removal of isolation. If phones are available in the village, when they need to make a call, they can find a way to make it. When they find the cost of a call too much, they quickly learn how to work the system. Regulators and politicians need to be

aware of this and concentrate on access rather than regulating the rules of retail.

The pro-poor features of pre-paid mobile often mirror universal service features which European regulators strove to achieve in the fixed network. But it has happened naturally through the market. Regulators who have withstood the clamour by consumer groups and politicians, as in Nigeria, to force mobile operators lower have been wise so long as the competitive forces have been allowed to emerge. Initial high prices, generous (while at the same time cost based) interconnection termination rates, have contributed to developments.

Reference:

Dymond, Andrew (2004a), "Challenges in Creating Viable Rural Connectivity Models in Developing Countries" Presentation at the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

9-6 What are the limits of viability and where is universal access intervention required?

A few hundred customers per base station may offer acceptable returns

Medium densely-populated low-income countries, such as Uganda or Nigeria, provide mobile operators with sufficient revenue to meet commercial rate-of-return objectives, combining private demand with high revenue public access lines in village locations. In Uganda, approximately 300 customers justified investment by a leading operator.

Non-Traditional Payphones for Public Access



Mediated public access is the most common emerging form of payphone, from India's STD PCOs to Morocco's Teleboutiques, Mogolia's street sellers and Nigeria's Umbrella ladies. In rural Bangladesh and Uganda, Village Phone Ladies are empowered through micro-credits.

Incoming revenues swell revenues

In Peru, approximately 60% of mobile operator revenues nationally come from incoming calls. In Chile, 60% of the revenues of the country's leading rural fixed-line operator come from incoming call termination payments from other operators.

Asymmetrical Interconnection

Cost-based, asymmetrical termination rates have been central regulatory measures used by the United States and Canada, as well as Chile, to ensure the viability of rural operators. Peru has recently enacted an asymmetrical interconnection policy for rural operators and Uganda is also experimenting with an asymmetrical regime for designated rural areas.

Universal Access Intervention

In rural Peru, a population of 7,000 generating a similar customer penetration has been estimated to provide only the marginal justification and may therefore be the limit at which subsidization would be required to encourage investment.

Reference:

Dymond, Andrew (2004a), "Challenges in Creating Viable Rural Connectivity Models in Developing Countries" Presentation at the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

9-7 Universal Access Intervention: What is the access gap?

There are two gaps not one

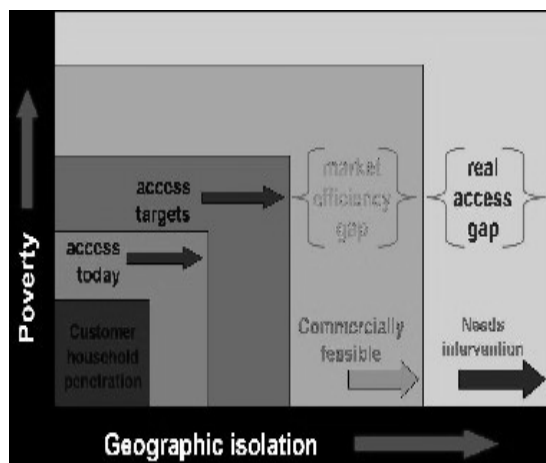
A reference for this may be found in several papers and reports Intelcon has written or participated in, notably the World Bank's Discussion Paper 432, "Telecommunications & Information Services for the Poor: Towards a Strategy for Universal Access", by A. Dymond, N. Juntunen, J. Navas-Sabater, 2000.

Market Efficiency Gap

This need not be the focus of universal access funding, since market reform alone can bridge the gap.

Real Access Gap

In some cases a 'smart subsidy' can mitigate risk, provide necessary capital and encourage operators to enter, where otherwise investment would be low priority. The long term outlook for these places is positive --- they can be commercially viable. The best practice vehicle for the intervention is typically the universal access fund or the so-called universal service fund. In other localities, low population density and remoteness might preclude a smart subsidy approach being successful. They might need longer term operating subsidies.



Reference:

Dymond, Andrew (2004a), "Challenges in Creating Viable Rural Connectivity Models in Developing Countries" Presentation at the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

9-8 What kind of incentives and subsidies are required?

Universal Access Fund (UAF)

UAFs are the means for the communications sector to meet the challenge of achieving universal access (UA) and country-wide market development from its own resources, and equitably. In most UAF examples to date, money is channelled from license fees, spectrum charges or a special levy (e.g. 1%) on the revenues of all operators and is set aside to assist those operators willing to serve high cost, challenging rural areas. UAFs

usually focus on rural network access and are sometimes named to reflect this, such as "Fund for Investments in Telecommunications" (Peru); "Rural Communications Development Fund" (Uganda); "Telecommunications Development Fund" (Chile). In Russia, the fund is called the Universal Service Fund.

Smart Subsidy

The most common term now applied to best-practice UAF intervention, but cannot address cases of chronic unviability. Subsidies for these cases --- often the least densely populated, most remote and high cost localities --- must be justified on social and political grounds alone and often involve satellite-based service provision.

Transparent & Fair Collection & Disbursement

UAFs are usually managed by an entity that is independent of both government and operators; in the majority of cases, this is under the auspices of the regulator, though with a distinct manager, board of trustees, bank account and reporting procedure. The Funds usually distribute designated amounts of money (maximum allowable subsidies) through a public "reverse auction" tender process, to reach specific areas or communities targeted by the Fund. The subsidies are awarded to the operators requiring the least subsidy to meet the policy targets.

Reference:

Dymond, Andrew (2004a), "Challenges in Creating Viable Rural Connectivity Models in Developing Countries" Presentation at the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

9-9 What information services do rural and low-income people need and demand?

Rural Demand Priorities

These views based on recent extensive demand research carried by Intelcon in Russia, Mongolia, Peru, Nigeria and Uganda in the development of universal access strategies.

Non-Voice Demand Driven by Economic Considerations

Many countries where mobile communications have overtaken fixed services are seeing rapid development of SMS (Short Messaging System) services.

Some information services still best delivered by other media

Various studies have argued this case and of course in many countries, the most ubiquitous and only medium is the national or local radio service, providing very useful market and agricultural information, health, education and other services including through interactive media such as help lines, chat shows, and sponsoring and announcing local events. Local media stations, as well as other service intermediaries, are special candidates for service improvement through access to the Internet.

According to the recent extensive demand research carried out by Intelecon in Russia, Mongolia, Peru, Nigeria and Uganda with regards to the development of universal access strategies, market information is the item placed highest priority.

Also, guidance, help and counselling lines for rural people is among the highest priority items. They are provided by a wide range of national, regional and community-based organizations and often best mediated through the telephone, though they would be enhanced through improved Internet enablement.

Reference:

Dymond, Andrew (2004a), "Challenges in Creating Viable Rural Connectivity Models in Developing Countries" Presentation at the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

9-10 What form of Internet & ICT service is viable?

All of the recommendations of the slides referred herewith in this chapter have been developed by Intelecon through recent studies and analyses of universal access studies in several countries. The essential elements were first developed during technical assistance for the UCC in developing Uganda's Universal Access strategy and investment program for the Rural Communications Development Fund (RCDF) in 2001/2. They were also published in a report entitled "The Next Step: A Rural ICT Program for Africa," and "Rural ICT Toolkit for Africa," prepared for African Connection and the World Bank's infoDev program in January 2003. Similar principles have been applied in later strategic studies on universal access for Russia and Mongolia.

Reference:

Dymond, Andrew (2004a), "Challenges in Creating Viable Rural Connectivity Models in Developing Countries" Presentation at the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Chapter 10 Universal Service Obligations

Access to communication means is the basic needs of human being. In many countries, the basic communications legislation prescribes the obligation of the government to achieve the Universal Service. How to materialize this obligation?

Curriculum Topics:

- 10-1 Why universal access?
- 10-2 How can universal access be achieved?
- 10-3 How to fund universal access?

10-1 Why universal access?

Universal access means that all citizens are able to use various services including communication, interaction and transaction services provided over the ICT infrastructure without too much inconvenience. This does not require a computer and an always-on Internet connection in every home. It could be provided through telecenters or through access from schools or workplaces.

Strong Correlation between ICT Use and Economic Growth

It has not been established that access to ICT causes economic growth, or that investment in ICTs yields more economic growth than public investment in areas such as education, roads and healthcare. What the research shows is that access to ICT can very effectively enhance the effects of other forms of public and private investments in the economy and society. ICT access may be described as a necessary, but not sufficient, condition for rapid economic growth.

Effective delivery of ICT services requires that most, if not all, citizens have access

Ubiquitous access to ICTs becomes very important if the government is promoting services such as e-government. Unless the government is making an effort to enable all of its citizens to use these services, it would be open to the criticism that it is discriminating between different groups. In addition, the government would have to maintain the non-ICT-based modes of service delivery,

duplicating service delivery at considerable cost.

Network Externality

ICT networks are of the greatest utility when more people can be reached; adding new users benefit current users. In the case of communication what matters are communicating opportunities: calling opportunities as well as opportunities to be called, or to use telephone languages. Adding new users benefits every current user because it increases communicative opportunities.

Reference:

Samarajiva, Rohan (2004), "Universal Access Fund: How does it work? How to manage it?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

10-2 How can universal access be achieved?

First and best method is to allow multiple suppliers to extend service. There is over 100 years of experience in the provision of telephone service. What this shows is that with the exception of Scandinavia and Australia, government-owned integrated monopolies have not connected most of the population.

This means removing barriers to competition. It has required the participation of other suppliers at the margins (e.g. cooperatives in Canada) and various forms of targeted

subsidies (e.g. Rural Electrification Administration Funds in the United States). In most countries, universal service was achieved only after the opening up of the market to competition. It is now recognized that market forces are better at extending networks than monopolies.

Where market will not supply short-term, government should identify the causes

However, market forces will not, of themselves, solve all the problems. Given the cost characteristics of existent technologies and the purchasing power of different user groups, it is possible that certain areas and groups will be underserved in the short- to medium-term. Sri Lanka, where despite following market-oriented policies and achieving very high growth rates, 5 out of 9 provinces with 35% of the population and 23% of the GDP have had to do with 14% of the fixed connections, illustrates the problem. Despite increasing the number of connections by more than four times over the past 8 years, the waiting list amounts to 43% of the subscribers at this time. What has to be done is to examine the causes of undersupply

If cause are the regulatory short-comings, they may require changes in law and policy. For example, many countries have interconnection arrangements that are biased in favor of incumbents or the interconnection rules are not enforced properly, creating economic disincentives for new operators to supply service to rural areas. Depending on the circumstances, the necessary action could be as simple as enforcing the existing rules, or as complicated as enacting new legislation and establishing a truly independent and effective regulatory agency.

If capital costs are the cause, complete or partial, the non-market-distorting remedy is the Least-Cost Subsidy Auction. Here the government will specify certain desired outcomes and will allow operators (current as well as potential) to bid for the task. The firm that asks for the least subsidy will win. This mechanism allows for the operation of market incentives at the time of bidding in that the successful bidder has incentive to supply the service in the most efficient manner possible. The Least-Cost Subsidy Auction also addresses the problem of maintenance and upgrading. Because the resultant network is owned by the bidder and because the operator

has committed its own investment, it has incentive to run the network as a viable business and make money from it.

If the cause of undersupply is perception of low revenues, there are a number of remedies that have been tried out. First, the perception may be wrong. Proper demand studies may correct this. If there is a real shortfall of purchasing power, there is value in aggregating demand through telecenters. This will also enable the use of vouchers that can be given to target groups who can redeem them at the telecenters. Of course, in the case of information retrieval and transactional services provided over the ICT infrastructure, there may also be a necessity to ensure that relevant and useful content is available in local languages and in usable form.

Reference:

Samarajiva, Rohan (2004), "Universal Access Fund: How does it work? How to manage it?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Intven, Hank and Curt Howard (2004), "Least-Cost Subsidy Auctions for Universal Access Telecom Projects: A Practical Implementation Guide" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

10-3 How to fund universal access?

Good regulation costs money. This can be obtained from general government funds (1st best solution) Regulatory costs as well as voucher and related demand-side subsidy costs tend to be recurring costs, though ideally the demand-side subsidies will be phased out after a pre-announced period or after certain objectives have been met. Public Finance theory tells us that the least distorting way to finance subsidies is from general funds.

Industry Levy: Distortional Impact

Industry levies have the result of artificially raising the price of the "taxed" services thereby distorting the overall market signals and affecting efficiency of resource allocation. If the levy is significant, it will encourage various forms of bypass activities. For example, the e-Rate and other universal service levies that are charged from US

telecom operators is a significant factor in the rise of Voice over Internet Protocol telephony services. The latter services are exempt from universal service levies. This leads to a situation where the subsidy payers who use old technology seek to block the new technology on the grounds of unfair competition.

From Regulatory Fees: Second Best

However, in many developing countries, there are serious difficulties in obtaining general government funds. For example, if regulatory agencies are funded from general funds, it may give the Ministry of Finance unnecessary leverage over the agency, or the salaries will have to be the same as those of government officials. Therefore, many countries fund their regulatory activities through some form of regulatory fee. A superior variant is to fund the agency solely from frequency charges and numbering charges, as in the case of Denmark. In the case of such dedicated levies, it is important that there are adequate safeguards against profligate spending.

Capital-Cost Subsidy

The above mechanism may not be adequate for funding capital-cost subsidies, which have a one-off character. Again, the least distortionary source of subsidy is the general treasury, but it is also the most problematic. If there is a sudden windfall-type gain in revenue, as for example the realization of the proceeds of a license auction or privatization, there may be merit in dedicating all or part of it for universal access subsidies. One way of obtaining government funds is the use of

multilateral or bilateral aid/loan funds. In Sri Lanka and Nepal, the Least-Cost Subsidy Auctions are funded by concessional credits from the World Bank. The non-grant element of the credits will be repaid in 30 years from general government funds, eliminating the distortions that result from industry levies. Hopefully, the returns from the investment will have been captured by the time of repayment, making it even more painless.

International Termination Revenues

Another source of funding that has been explored is that of international termination revenues, something that used to be very lucrative but is rapidly been driven down by competition. Sri Lanka's Vishva Grama Fund legislation aimed to capture a part of the revenues from international termination for a delimited 5-year period, at which point the levies as well as the subsidies would cease.

Reference:

Samarajiva, Rohan (2004), "Universal Access Fund: How does it work? How to manage it?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Intven, Hank and Curt Howard (2004), "Least-Cost Subsidy Auctions for Universal Access Telecom Projects: A Practical Implementation Guide" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Chapter 11 Universal Access Fund

One innovative mechanism to materialize the Universal Access/Service is the establishment of Universal Access/Service Fund. What is the function of UAF and how to create it?

Curriculum Topics:

- 11-1 What is Universal Service (Access) Fund?
- 11-2 Which countries have introduced a UAF?
- 11-3 Why subsidies, not cross subsidies?
- 11-4 Who should get UAFs? (demand-side)
- 11-5 Who should get UAFs? (supply-side)
- 11-6 UAFs and technology neutrality
- 11-7 What are the important considerations in designing a UAF?
- 11-8 What are the success factors for UAFs?
- 11-9 How to manage UAFs?
- 11-10 How do UAFs promote Internet access and Telecenters?

11-1 What is Universal Service (Access) Fund?

One prominent mechanism for mobilizing investment into challenging rural areas is the universal access fund or rural telecommunications development fund model. These funds offer licenses and subsidies, under a single competitive bidding process, to operators wishing to serve designated areas or communities selected by Government. The funds initially focused on creating and supporting telephone service licenses to provide payphones in challenging areas, but now some also offer subsidies for Internet access and advanced ICT projects.

Bridging the Access Gaps

Universal Access is the goal adopted by many developing countries to provide convenient and affordable access to communications, at least on a community basis, through a combination of private and public access facilities such as payphones and telecenters. Liberalized market needs universal access policies and mechanisms to ensure that communications and information services

reach all segments of society, including the urban poor and rural communities. The strategy can be envisaged as focusing on two separate gaps addressed with quite different mechanisms:

Reference:

Dymond, Andrew & Sonja Oestmann (2003), "Rural Telecommunications Development in a Liberalizing Environment: An update on universal access funds" December 2003 http://info.worldbank.org/ict/WSIS/docs/comp_RuralTelecom.pdf

11-2 Which countries have introduced a UAF?

The idea of making finance available competitively under a reverse auction (lowest subsidy demanded wins) and generating new licenses for rural operators has only existed since 1994:

In 1994, Chile established Fondo de Desarrollo de las Telecomunicaciones. Five countries (Chile, Peru, Colombia, Guatemala

and Dominican Republic) have to date actually licensed rural operators through such funds. Several others in Latin America are about to commence operation or are planning to do so.

In Asia and Africa, two countries --- Nepal and Uganda --- are currently implementing schemes and a handful of others are following in their footsteps. A fund in South Africa, administered by the Universal Service Agency, is on a smaller scale and provides finance to community telecenters only.

Revenue Sources

Funds receive their finance from sources such as direct Government contribution (Chile, Colombia), a levy on operators (Peru: 1%, Dominican Republic: 2%), or radio license fees (Guatemala).

Actual Grants Provided

It can be seen that on average, the amount of subsidy actually bid and granted has been less than half the maximum offered by the funds. However, the averages hide a wide range of experiences, from zero subsidies in some of the early Chilean competitions to 100 percent of the offered amount in later rounds.

Reference:

Dymond, Andrew & Sonja Oestmann (2003), "Rural Telecommunications Development in a Liberalizing Environment: An update on universal access funds" December 2003 http://info.worldbank.org/ict/WSIS/docs/comp_RuralTelecom.pdf

11-3 Why subsidies, not cross subsidies?

Incumbents love cross subsidies. They justify the extraction of monopoly profits and can be used to obtain government assistance in preventing entry. They are easy to administer in that the entire process is internal to a firm or firms. And all that the government has to look at is outcome.

However, cross subsidies rarely, if ever, yield the desired results and are anti-competitive. No country that has accepted the WTO regulatory reference paper on telecommunications can create new cross-subsidy schemes sanctioned by Government. At a minimum they are bound to administer funds through competitively

neutral and least burdensome methods such as UAFs.

Reference:

Samarajiva, Rohan (2004), "Universal Access Fund: How does it work? How to manage it?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

11-4 Who should get UAFs? (demand-side)

There is significant value in demand-side subsidies because they have a closer relationship with outcomes. Yet, the larger numbers of recipients means that transaction costs can be very high and that there will be potential for rent-seeking and abuses.

Important to have low-cost, easily defensible criteria

Unlike in developed countries where there exist well developed information systems such as tax files and social security, it is very difficult to obtain accurate information on recipient's economic standings in developing countries. Even in developed countries, it is common to link eligibility for one form of subsidy to another. For example, in the United States, the lifeline telephone subsidies are given to those who have qualified for energy subsidies. If such a reference point is available, it may be useful to link the universal-access subsidies to that, rather than attempting to devise a whole new eligibility scheme. An alternative is to go for easily identifiable groups such as school-leavers, which was the solution adopted in Sri Lanka's demand-side subsidies for ICT services delivered through telecenters.

Discount for Low-Users

Another modality is to connect the subsidy eligibility and payment directly to the billing systems of the operators. Low-user tariffs are a classic example of very low transaction cost subsidies. Here, the lower rate is applied on the basis of actual usage. Whether one gets a subsidy is not dependent on self-reporting or an official's judgment, but on actual use.

Consideration Needed for a Voucher System

In designing voucher schemes, it is very important that full consideration be given to issues such as tradability and determination of

eligibility. In general, simplicity of administration and transparency should trump precision and elimination of all forms of deviant behaviour.

Reference:

Samarajiva, Rohan (2004), "Universal Access Fund: How does it work? How to manage it?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

11-5 Who should get UAFs? (supply-side)

This question is limited to supply-side subsidies, wherein the suppliers obtain the funds directly, as opposed to demand-side subsidies where the funds go to the users who then pass it on to the suppliers in return for services.

Not the Incumbent, as of Right

In many countries, the incumbent will make a loud case for special eligibility for UAFs. This should be resisted. Given the enormous advantages they have enjoyed and the public funds they have had exclusive use of, a case can even be made that incumbents should be excluded from all of part of new universal access programs. But this will rarely be practical. What is important is that there should be competition for the funds and that no one firm, or a small number of firms, should receive the funds as of right. This will not eliminate, but it will reduce, the likelihood of padding of expenses and other malfeasances as were found in the e-Rate program.

Ideally, there should be broad eligibility for UAFs: Not only the existing operators but even those who are willing to enter the market.

There should be no ironclad relation between who pays in, and who can receive pay outs. Universal access levies on services or firms are a form of expropriation. Therefore, it is natural for firms to resist these levies and demand that if they are levied they should have privileged access to funds taken from their operations. This violates the principal that there should be some form of competition for the funds giving rise to efficiency.

One Innovative Idea in Sri Lanka

In one design that was extensively discussed in Sri Lanka, the procedure was that funds taken from the operations of one firm would go to an "escrow" account in its name. If it did not withdraw that money according to pre-set criteria within a specified time, the money would be transferred to a challenge fund that was open to all the firms within the program. The intention was to create incentives for rapid rollout of the network and also to ensure that the money would be all spent before the program was sunsetted.

Reference:

Samarajiva, Rohan (2004), "Universal Access Fund: How does it work? How to manage it?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

11-6 UAFs and technology neutrality

In rapidly changing and uncertain technological and market environments, technologically specific subsidies, however small, can tip the balance in favor of one technology. This is generally to be avoided.

Bias Towards Old Technologies

In many cases, UAFs are disbursed to existing operators who use them in ways protective of their old investments, e.g., bias toward fixed connections over mobile; voice over data; and circuit-switched over packet-switched

Technology-Neutral Funding Mechanisms

Recent work done in Sri Lanka by the Public Interest Program Unit assisted by Arculli Associates, Gilbert & Tobin and Network Strategies on rural connectivity units, points to the possibilities of designing subsidy schemes that are technology-neutral. In light of the mandate to devise a subsidy unit that would not discriminate against mobile as well as VOIP, the solution that was devised was based on Erlangs per administrative unit, qualified by some threshold qualifying levels for population density.

Reference:

Samarajiva, Rohan (2004), "Universal Access Fund: How does it work? How to manage it?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

11-7 What are the important considerations in designing a UAF?

- Let the market take the network as far as it can.
- Regulatory shortcomings must be remedied.
- In devising subsidy schemes be attentive to distortions of the market and opportunities for corruption and arbitrage.
- Management must be low-cost, transparent and designed to avoid bureaucratic bloat.
- Management must be low-cost, transparent and designed to avoid bureaucratic bloat.

Reference:

Samarajiva, Rohan (2004), "Universal Access Fund: How does it work? How to manage it?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

11-8 What are the success factors for UAFs?

The successes appear to be due to a combination of careful fund design and supportive regulation. On the other hand, as with any innovation, not all of the potential problem areas could be anticipated or fully addressed in advance. Some of the challenges have arisen largely due to international market factors and issues or failures encountered by licensees that, while beyond the control of governments and regulators, must also be taken into account in future design.

Most of the funds have broadly achieved the access targets set by Government. Whereas a detailed evaluation report has been prepared on the Chilean case, various sources have been used to assess the experience in the other countries.

Competitive Mechanism and Multiple Licensing

All funds have used a minimum subsidy bidding mechanism that was well understood and that successfully exploited the competitive spirit of the bidders. The bidders have included incumbents wishing to secure territory and new entrants wishing to gain a foothold in the marketplace.

In Chile, Peru, Colombia and Guatemala, the division of license territories into regions and areas and the opportunity to bid for multiple licenses allowed bidders to assemble territorial blocks according to corporate interests. While resulting in some considerable variation in the level of competition from case to case, this provided an opportunity for some entrants to assemble major national holdings through aggressive pricing of their bids.

One-Stop Process and Attractive Licenses

The bids have typically offered the opportunity to obtain operating licenses, a capital subsidy and radio frequency licenses, allowing operators to reduce time, paperwork and costs associated with regulation. This is especially attractive to new entrants. Bidders for many of the rural payphone licenses were allowed to also serve other business and residential customers and to propose unregulated services that were added to their licenses and contribute to commercial viability. One operator in Chile that won licenses requiring 1,800 payphones has built an extensive regional network with 18,000 lines.

Supplier Market Interests

The majority of successful bidders in Chile, Peru, Colombia and Guatemala have been either directly owned by or allied to suppliers of rural telecom technology, e.g. VSATs or multi-access wireless, who have seen the licenses as major opportunities for themselves.

Good Regulatory Design and Interconnection

A sound regulatory environment enables the subsidies to be 'smart' in the sense of their assisting with early start-up of profitable ventures. This is exemplified by the Chilean case, which allows operators to charge higher tariffs (up to a regulated limit) & provides cost-related asymmetric interconnection rates. The interconnection regime gives rural operators access charges that are several times higher than those of urban operators. This creates significant revenues from incoming call traffic and the incentive to exploit demand for incoming calls. As an example of the impact of this, the largest Chilean rural operator derives 60% of its total revenues from its positive interconnect balance with urban operators, allowing it to recover costs and develop the significant business opportunity from incoming calls. Colombia has also recently implemented a cost-based

asymmetric interconnection regime for rural operators and Peru is planning to do so.

Demand Study and Clear Targets

Use of good market research and demand analysis in the fund establishment process provided helpful assistance to bidders. Most countries provided quite comprehensive data to bidders - in Chile, even specific site locations for payphones were identified by local authorities, community associations, other organizations and the public at large.

Reference:

Dymond, Andrew & Sonja Oestmann (2003), "Rural Telecommunications Development in a Liberalizing Environment: An update on universal access funds" December 2003 http://info.worldbank.org/ict/WSIS/docs/comp_RuralTelecom.pdf

11-9 How to manage UAFs?

Subsidies attract the corrupt. It is therefore essential that strong safeguards be built into the management of the funds.

Subsidy Abuse Cases in United States

As the most recent example of the e-Rate subsidy funds in the United States has shown, there is a high potential for abuse of subsidies. The e-Rate is a classic universal service levy in that conventional operators and their customers pay it, in some cases bundled into the charges and in others as a separate line item on customer bills. Recent audits have uncovered instances of significant overcharging and other abuses. In developing countries where government is seen as a way for politicians and officials to make money, even greater safeguards must be set in place to prevent abuse of subsidy funds.

Separating the Subsidy Scheme Design and the Fund Administration

Generally speaking, it is best that all subsidies are subject to sunset provisions. To preclude the normal bureaucratic incentives from kicking in to perpetuate the subsidies and the management agency, it is best that the design of the subsidies be the responsibility of an entity other than the management agency. In this model, the tasks of the management agency as simple: implement the rules and ensure that abuse is minimized.

Best Practice: Outsourcing

This responsibility can be easily outsourced to an organization like a bank. The management agency can in turn outsource the audit of resultant activities and other functions to specialized firms.

Oversight by Advisory Committees with Industry Representation

Given the necessity of transparency, it is advisable that advisory committees that include representatives of different groups from industry and possibly some users be constituted.

Reference:

Samarajiva, Rohan (2004), "Universal Access Fund: How does it work? How to manage it?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

11-10 How do UAFs promote Internet access and Telecenters?

The attention of several funds includes extending Internet access and advanced services, either as the next objective after telephony targets have been met or as a complementary goal.

Three funds have implemented Internet access or telecenter/infocenter programs so far: in Latin America the Colombian and Chilean programs, and the Universal Service Agency (USA) in South Africa.

A few other funds are planning to include support for Internet points-of-presence or telecenters (e.g. Uganda, Dominican Republic, Bolivia), while the Dominican Republic includes e-learning and telemedicine projects in its portfolio. Peru's FITEL is also financing pilot projects involving the Internet.

South Africa - Universal Service Agency: A few are financially sustainable

Lessons thus far are drawn mainly from South Africa's USA, which has implemented telecenters from as early as 1998, while promising ideas are emerging from Chile's and Colombia's program, which have commenced very recently. Various sources agree that virtually none of the 90 or so South African telecenters are self-sustaining after the initial funding and many have already closed.

Even the best cases, e.g. Gaseleka, have declining profits and no way of covering equipment depreciation. This is similar to telecenters unrelated to funds. However, well-managed telecenters with a variety of ICT-enabled value-added services could be of tremendous benefit to rural and low-income communities. That is why the Interest is justified.

Telecenter Commercial Bidding

Latest thinking is that telecenters need to be commercial, mostly small-scale and led by entrepreneurs in order to ensure sustainability and proliferation. This is because developing countries simply do not have sufficient resources to support a large number on an ongoing basis. However, to date very few projects have been set-up on a commercial

basis; for example, South Africa's telecenters are sponsored by community-based civil organizations and NGOs. Colombia is the first fund to successfully implement a competitive bidding scheme for private operators, allowing economies of scale by bidding telecenters in the hundreds. This will facilitate telecenters to be run by local entrepreneurs in the community but with the support of a network and management organization.

Reference:

Dymond, Andrew & Sonja Oestmann (2003), "Rural Telecommunications Development in a Liberalizing Environment: An update on universal access funds" December 2003
http://info.worldbank.org/ict/WSIS/docs/comp_RuralTelecom.pdf

Chapter 12 Smart Subsidy Scheme

Universal Access Fund provides subsidy for private rural telecom providers who bid for a minimum subsidy to provide certain level of services. How the Smart Subsidy scheme does work? How successful it was in achieving universal access in developing countries?

Curriculum Topics:

- 12-1 What is least subsidy bidding for rural telephony?
- 12-2 What is the advantage of Smart Subsidy Auctions?
- 12-3 What are the risks and how to mitigate them?
- 12-4 How big is the subsidies required and how to fund them?
- 12-5 How to design the project
- 12-6 What documents should be prepared for subsidy auction?
- 12-7 Is pre-qualification process necessary? How to prepare a Request for Pre-Qualify (RFPQ)
- 12-8 How to prepare a Request for Proposal (RFP)?
- 12-9 What is Service Agreement and how to prepare it?
- 12-10 How to grant a license to operate networks?
- 12-11 What are the steps to implement UA project?

12-1 What is least subsidy bidding for rural telephony?

Innovations in technology, combined with pro-competitive reforms, are rapidly expanding access to telecommunications in many developing countries. But extending basic telephone access to the rural poor can remain a stubborn problem. To tackle this problem, Peru is using a “Least-Subsidy” bidding approach.

Bidding for Minimum Subsidy

Private telecommunications operators bid for the minimum government subsidy they require to provide payphone service in targeted rural areas. Part of the subsidy is paid on award, part once the equipment is installed, and the rest in semiannual installments for several years, contingent on compliance with performance standards.

Private Investment

Mobilized Twice the Subsidy

Winning bidders get a nonexclusive concession defining their rights and obligations. Early pilot results show that the private investment mobilized is twice as large as the subsidy provided.

Reference:

Cannock, Geoffrey (2002).
“Expanding Rural Telephony - Output-Based Contracts for Pay Phones in Peru”
in Penelope J. Brook and Suzanne M. Smith eds. (2002), *Contracting for Public Services: Output-Based Aid and Its Applications*,
World Bank
<http://rru.worldbank.org/Documents/Other/06ch1.pdf>

12-2 What is the advantage of Smart Subsidy Auctions?

One-Time Subsidy

Auctions usually provide a one-time investment subsidy for private operators willing to expand network and provide required service

Minimizing the Size of Subsidy

Well-run auction reduces the size of subsidy and need for government financing. The fact that the subsidy is:

- (i) Efficiently targeted to meet a specific network expansion objective, and is
- (ii) Auctioned to ensure least-cost to funding agency distinguishes least-cost auctions from traditional cross-subsidies in the telecommunications industry.

Traditional cross-subsidies use excess revenues from profitable services to fund network expansion into uneconomic areas and revenue shortfalls from unprofitable services. However, traditional cross-subsidies are typically inefficient (e.g. low local tariffs benefit rich and poor users alike), and very difficult to monitor.

Therefore, it is market forces rather than the Government that determine the level of subsidy required

Competitively Neutral

Traditional cross-subsidies are also subject to potential anti-competitive abuse. For example, excess revenues from profitable services can subsidize lower rates for competitive services (instead of, or in addition to, rural network expansion). Recognizing this concern, the WTO Reference Paper requires member countries to administer universal service programs in competitively neutral manner. When properly run, least-cost subsidy auctions have the advantage of being competitively neutral, and thus fully compliant with the WTO's rules.

Mobilize Private Investment

Small subsidies can mobilize substantial private investment for UA

Reference:

Intven, Hank & Curt Howard (2004), "Least-Cost Subsidy Auctions for Universal Access Telecom Projects: A Practical Implementation Guide" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

12-3 What are the risks and how to mitigate them?

Success in securing licensees has not necessarily always led to healthy operations and some market factors transpire to render at least some operators unable to reach their hoped-for potential, to provide good service or reach their targets. Some of the issues surfacing demonstrate that political or international market developments can influence outcomes irrespective of how well the fund or the regulatory regime is designed. However, the benefit of experience provides an opportunity to consider options for improving the fund process or for bringing additional strategic resources into the arena, to create a greater robustness.

Sustaining Competition

Companies' appetite for aggressive bidding to secure licenses is related to their strategic objectives. It appears stronger during the initial phases when companies are positioning themselves, but declines when the market has stabilized. In one case, a successful bidder accepted zero subsidies in order to get a foothold, develop its targeted territory and secure long term control of radio frequencies. Once initial objectives are realized or the potential for new competitive entry declines, company motivation for low bidding can diminish. This risk can be reduced, but not necessarily eliminated altogether, by fund managers considering competitive market interests in the design and packaging of license territories. This means that they should assess the apparent commercial interests of the players likely to bid, and package the license areas in such a way as to maximise the number of communities that will be included with strategically attractive territories.

Problem of the Most Marginal Localities

Some license territories, irrespective of strategic interests, are much less viable than territories containing broad opportunities for service growth and diversification or wider technology choice. This is seen especially in some of the areas won by VSAT-based operators. The remoter sites in Chile appear to have suffered more from this problem than cases with better economies of scale. Mitigation of this risk for future fund implementations perhaps lies with mixing attractive with less-attractive service areas,

offering larger license areas to ensure economy of scale, or perhaps even applying a higher, second level of interconnect access charge to reflect the costs of the more remote communities. Whereas the ideal formula will vary from country to country, there is no doubt that here again careful license packaging is a crucial issue. It could be that ultimately, some funds having to deal with extremely high-cost areas may have to consider operational as well as capital subsidies, to secure long-term operator viability.

Consequences of Low-Bidding

In some cases, it appears that a few companies risked their financial health by low-bidding to gain market position. A feature of the Chile, Peru and Colombia competitions is that many winning bids were very aggressive. Peru's 1999 competition was won by a company bidding only 20 percent of the available subsidy. Combined with subsequent political and international market developments, it appears that this led to the company being unable to meet its roll-out targets. This type of hazard could perhaps have been addressed by demanding a higher performance guarantee, or by subjecting winning bids to a more rigorous due diligence practice.

Operational Experience of Bidders

In most cases, rural license opportunities have not attracted large international operators, except sometimes from incumbents, though often they have been unsuccessful bidders. Whereas incumbents in Chile and Dominican Republic have won bids, the dominant bidders in Peru, Colombia, Guatemala and Chile, have been relatively inexperienced and newly formed operators, associated with or owned by technology suppliers. The main motivation of some of these suppliers was clearly to secure markets for their products. Although some subsequent struggles can be attributed to worsening market conditions, it also appears that their understanding of customer service and marketing was less than total. This has led to sub-optimal market performance and service provision in some cases, or to lack of confidence in the market. More stringent pre-qualification rules would limit risk to some extent, and the introduction of more rigorous due diligence prior to concluding license agreements could also address this problem. The involvement of a major financial player (e.g. a development bank or

consortium), backing the fund with the capacity to injecting finance, but with the requirement for minimum qualifying standards from the winning bidder, would be preferable to a due diligence by the fund administration itself.

Reference:

Dymond, Andrew & Sonja Oestmann (2003), "Rural Telecommunications Development in a Liberalizing Environment: An update on universal access funds" December 2003 http://info.worldbank.org/ict/WSIS/docs/comp_RuralTelecom.pdf

12-4 How big is the subsidies required and how to fund them?

Fund may be financed by a UAF

Subsidies may be financed by a Universal Access Fund or by other sources, such as International Financial Institutions (IFIs) or international development agencies

How is UAF funded?

UAFs may be funded by:

- Mandatory contributions from all telecom service providers (e.g. a specified percentage of revenue)
- National budgets (tax revenues)
- Contributions from IFIs

Size of Rural Subsidies

From the experience in Latin America and Nepal, the size of the subsidies per town served is between \$3,600 (Chile) to \$9,500 (Peru).

Reference:

Intven, Hank & Curt Howard (2004), "Least-Cost Subsidy Auctions for Universal Access Telecom Projects: A Practical Implementation Guide" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

12-5 How to design the project

Properly designing the infrastructure and services to be supplied is the key to success in meeting universal access (UA) needs

National UA Policy/Strategy usually defines general UA goals --- generally does not

specify network gaps to be filled or economic implications.

The least-cost auction process should be carefully designed so that the network and/or services which are its ultimate output will take the regulator or government closer to meeting its UA goals. Here are the things that need to be considered in designing the auction process:

- Network specs.:
 - fixed, mobile, broadband mixed
- Services:
 - e.g. public telephones, Internet access, call centers
- Geographical coverage areas
- Rollout schedule

For example, it may be that a government determines that its UA needs can best be met through a subsidized project that will provide completely new backbone and access networks for voice services in an underserved region, including public payphones and private lines. However, in other countries, only specific missing pieces may be identified as preventing the expansion of UA, such as lack of backbone networks. As such, it may be determined that the subsidized project should result in the provision of a backbone network, whereas local entrepreneurs will be relied on to provide local access and services (e.g. phone shops, telecenters, etc.) in the underserved region.

When Government carries out market demand study, it usually:

- (1) Reviews population dispersion, income, available services, unserved areas, etc.;
- (2) Can assist in identifying demand for:
 - network expansion
 - types of services required and financially feasible (e.g. telephone, low or high speed Internet, shared telecenters, etc.)
 - estimated revenues & subsidy requirements
- (3) Subsidy should cover net cost of network expansion, i.e. after deducting projected revenues from area to be served.

As a rule of thumb, Public operators will pay 2-3% of income from telecom services.

Reference:

Intven, Hank & Curt Howard (2004), "Least-Cost Subsidy Auctions for Universal Access Telecom Projects: A Practical Implementation Guide" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

12-6 What documents should be prepared for subsidy auction?

The following documents are examples of documents commonly used to implement least-cost subsidy auctions. The required documentation will vary, depending on the nature of the project and the project environment, including national laws, regulatory, business and financing practices.

RFPQ: Request for Applications to Pre-Qualify

RFP: Request for Proposals

Service Agreement: Contract for the provision of the services and payment of the subsidy

License: License to operate the new network and provide the services

Ancillary Documents: Bid bonds, performance guarantees, etc.

Reference:

Intven, Hank & Curt Howard (2004), "Least-Cost Subsidy Auctions for Universal Access Telecom Projects: A Practical Implementation Guide" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

12-7 Is pre-qualification process necessary? How to prepare a Request for Pre-Qualify (RFPQ)

RFPQ is often the initial document to "kick-off" the process to award the Service Agreement and Licence to the lowest bidder. The RFPQ will often:

- Introduce potential bidders to the project;
- Provide some background information on the national or regional telecom sector; and

- Serve as an initial screening process for parties that will be permitted to participate in the full competition process initiated by the RFP

Pre-qualification process necessary because eliminating it can speed up process. However, we need to take account of the following risks associated to the pre-qualification process:

- It significantly reduce the number of bidders that participate in the full auction process (in some of our processes, 50+ bidders have applied);
- It places the focus on the best qualified bidders, and reduces problems and litigation from technically or financially unqualified bidders; and
- It significantly reduces costs incurred by less 'serious'/qualified bidders who must otherwise prepare full proposals funding agencies and their advisors that must fairly review and evaluate all proposals

Criteria for Pre-Qualification

Criteria for pre-qualification pursuant to the RFPQ and qualification pursuant to the RFP should be designed in such a manner to filter-out parties that are not capable of providing the UA services in accordance with the specifications, while not excluding good candidates.

Usually the RFPQ will require less detailed evidence in support of a bidder's qualifications than that required by the RFP. The pre-qualification and qualification criteria will vary depending on the nature of the project, and may include such things as:

- Financial resources at or above a minimum amount (e.g. net worth of bidders, lines of credit from a bank, etc.);
- Minimum level of experience in operating a network similar to the UA network to be funded by the subsidy (e.g. provision of voice service to a minimum number of subscribers in rural areas for minimum period of time);
- Compliance with regulatory requirements (e.g. must provide a letter from a regulatory authority specifying compliance with conditions of any existing telecom licences held by the bidder, etc.)
- Eligibility to receive subsidy pursuant to the rules of the IFI or international development agency, if one is involved in the project.

Reference:

Intven, Hank & Curt Howard (2004), "Least-Cost Subsidy Auctions for Universal Access Telecom Projects: A Practical Implementation Guide" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

12-8 How to prepare a Request for Proposal (RFP)?

RFP has different terminology: RFP, Request for Applications, Tender document, etc. It defines steps in competition process, and award of subsidy and Licence.

Here are the detailed procedures for the awarding a service contract and a license:

- (1) Filing of proposals, opportunities for clarification questions, bidders conferences, revisions of RFP, and basic rules of competition;
- (2) Format and contents of proposal and information to be submitted;
- (3) Evaluation of proposals' licensing criteria must be provided under WTO Reference Paper;
- (4) Selection of the successful bidder; and
- (5) Award of the Service Agreement and Licence

The key rights and obligations of the successful bidder may be set out in a draft Service Agreement and/or a draft Licence, which may be attached to the RFP.

Evaluation Process:

One Envelope vs. Two Envelopes

Evaluation may proceed in a One-envelope, or Two-envelope process.

In a one-envelope process, both the qualification/service and financial bid components of the proposals are submitted by bidders in a single envelope and are opened at the same time. The qualification/service proposals are evaluated and the qualified bidder that has submitted the lowest bid is awarded a subsidy.

In a two-envelope process, the qualification/service and financial bid components are submitted by bidders in separate envelopes. The first envelopes, containing the qualification/service

components, are opened first and evaluated. Bidders that have failed to qualify will have their second envelopes, containing the bids, returned to them unopened. The bid envelopes of qualified bidders will then be opened and evaluated and the bidder that has submitted the lowest bid is awarded a subsidy.

The two-envelope process is often seen as providing increased protection against accusations of interference and corruption, as the qualification process is completed by the evaluating body without any knowledge of the bid amounts. However, a one envelope system may result in selection of a better qualified bidder and elimination of less qualified ones.

Reference:

Intven, Hank & Curt Howard (2004), “Least-Cost Subsidy Auctions for Universal Access Telecom Projects: A Practical Implementation Guide” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

12-9 What is Service Agreement and how to prepare it?

Service Agreement is a good basis for governing payment of the subsidy. It provides contractual certainty to permit financing of project and service requirements. It also includes alternate approaches; licence conditions and letter of credit from UA Fund.

Service Agreement specifies:

- Network construction milestones, and service rollout;
- Technical performance requirements, including services to be provided, quality of service, etc. (similar to commercial telecom service agreements);
- Penalties and remedies for failure to perform;
- Procedures for certifying completion of phases of project & subsidy payments; and
- Dispute resolution procedures

Also, it also describes other commercial provisions including:

- Representations & Warranties, Performance guarantees;
- Term, termination & amendment rules;
- Force majeure and non-performance;
- Insurance, indemnity, etc.

- Other standard commercial agreement terms

Sample Table of Contents

The following is a sample table of contents from a Service Agreement:

Article 1: Interpretation
Article 2: Provision of UA Network and UA Services
Article 3: Ownership and Control
Article 4: Construction and Service Failures
Article 5: Payment of the UA Subsidy
Article 6: Security for Performance
Article 7: Insurance
Article 8: Technical Audits
Article 9: Relationship Management And Reporting
Article 10: Dispute Resolution
Article 11: Representations and Warranties
Article 12: Indemnification
Article 13: Force Majeure
Article 14: Confidentiality
Article 15: Term and Termination
Article 16: General Commercial Terms
Schedule A: UA Services, Availability and Quality Specifications
Schedule B: UA Service Provider’s Tariffs
Schedule C: UA Network Specifications
Schedule D: Mandatory Service Areas
Schedule E: UA Network Construction and Subsidy Payment Schedule
Schedule F: Material Events of Default
Schedule G: Security for Performance

Reference:

Intven, Hank & Curt Howard (2004), “Least-Cost Subsidy Auctions for Universal Access Telecom Projects: A Practical Implementation Guide” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

12-10 How to grant a License to operate networks?

Most countries’ laws require a licence to construct and operate networks and to provide basic telecom services. Licences typically contain main operational rights and obligations of telecom service providers.

Various Licensing Approaches

- New licence designed for UA project;

- Adapt standard form of licence issued by Regulatory Authority; and
- Amend licence of an existing operator, if an existing operator should win the competition for the subsidy contract

The approach to licensing will vary from project to project, depending on a number of variables. For example, where there are no existing or standard form licences for the type(s) of services being funded by the subsidy, a new licence will likely need to be created. On the other hand, where existing operators win the subsidy and are already licensed to provide the type(s) of services specified, it may be preferable to make any required amendment to their existing licence(s) to permit them to provide the services in accordance with the project requirements. If a regulator's licence amendment procedures are too complex or would take too long to implement, issuing a new licence will likely be preferable.

Spectrum Licences

Spectrum licences may be required in addition to operating licence should be granted as part of initial licensing process without further cost or delay

Reference:

Intven, Hank & Curt Howard (2004), "Least-Cost Subsidy Auctions for Universal Access Telecom Projects: A Practical Implementation Guide" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

12-11 What are the steps to implement UA project?

Preparation Stage:

It is important to market the project adequately to ensure that a large enough pool of interested and capable bidders is made aware of the opportunity. The marketing approach used may vary depending on a number of factors (e.g. whether only domestic parties are permitted to participate in the auction or it is open to international competition). Notices can be placed on the websites of the parties implementing the auction (e.g. Ministry, regulatory authority, IFI, etc.). Notices can also be placed in newspapers circulating in target markets and in industry-specific periodicals.

- Develop or revise UA Policy;
- Amend any laws or policies to facilitate least-cost auction process;
- Undertake demand study/financial analysis of specific project(s) to be subsidized;
- Determine outputs: services & infrastructure - technical design and performance requirements;
- Prepare auction process documents; and
- Identify possible bidders, issue RFPQ and commence marketing activities

Auction Implementation Stage:

The timing of each of the steps in the auction implementation plan will vary from project to project, depending on a number of factors. However, parties implementing auctions should keep certain essential timing issues in mind. For example, deadlines for the submission of questions of clarification from bidders, and for the submission of bids, should not be excessively short, as this will discourage serious bidders from participating.

On the other hand, the period for evaluation of proposals should not be excessively long, as this has the potential to invite political interference and to increase the chances of market fluctuations that could negatively impact the project.

- Evaluate applications to pre-qualify;
- Issue RFP document to pre-qualified parties;
- Questions of clarification from bidders (and entertain proposed changes?);
- Conduct pre-bid meeting with pre-qualified parties; and
- Answer questions of clarification and make necessary changes to process to meet market requirements

Evaluation, Decision Stage:

- Deadline for submission of proposals;
- Evaluate proposals;
- Optional: Issue of Letter of Intent to the qualified bidder(s) with lowest subsidy bid; (i.e. intent to award subsidy once any necessary preconditions are met);
- Winning bidder(s) comply with preconditions (e.g. incorporation of local company, submission of performance guarantee, etc.); and
- Execute Service Agreement and issue License

Performance Guarantee

Performance guarantees are a useful tool to encourage successful bidders to fulfil their UA service obligations. They can take different forms, including a stand-by letter of credit. Such guarantees should come from banks or other financial institutions acceptable to the party implementing the auction. If the amount of the performance guarantee/stand-by letter of credit is to be very large, this will increase the costs incurred by the bidders, compelling them to bid higher amounts. Thus, the party implementing the auction should consider drafting the guarantee so that the total amount of the guarantee is reduced in tranches upon completion of each of the rollout milestones.

Network Rollout Stage:

The network rollout schedule should be set out in the Service Agreement and/or Licence. It should include realistic target dates for achievement of rollout milestones. Subsidy payments can be made in tranches upon achievement of each rollout milestone.

A “hold back” of the final part of the subsidy can be kept by the funding party until completion of a final rollout milestone, namely the ongoing provision of the UA service at the specified levels of capacity and quality for a specified period of time.

However, funding parties should avoid the temptation to make such a hold back excessively large, as this will likely cause the capital costs of the bidders to increase, as they will have less subsidy available for their start-up costs. This may compel bidders to bid higher amounts.

In addition to a hold back of part of the subsidy, complete rollout of the network can be secured through a performance guarantee.

- Winning bidder(s) begin network rollout;
- Subsidy payments made in accordance with service rollout milestones;
- Ongoing monitoring and reporting requirements; and
- Network rollout and subsidy payments completed in accordance with schedule in Service Agreement

Reference:

Intven, Hank & Curt Howard (2004),
“Least-Cost Subsidy Auctions for Universal
Access Telecom Projects: A Practical
Implementation Guide” Presentation for the
International Seminar on ICT Policy Reform
and Rural Communication Infrastructure

Chapter 13 Uganda's Approach to Universal Access

Uganda started the comprehensive Rural Communications Development Policy under the universal service legislation. Under this law, Uganda created a Rural Communications Development Fund, which aims to support rural telecoms and other needed communication infrastructure with private participation.

Curriculum Topics:

- 13-1 How did the reform process to achieve Universal Access start in Uganda?
- 13-2 What does rural mean?
- 13-3 What are the needs of the rural communities and how can the RCDF be used to address them?
- 13-4 What are the key components of the RCDP if it is to add value to the human development process?
- 13-5 What is the envisaged delivery strategy?
- 13-6 The Master Plan: What are the targets, cost projection, timeline, priorities, and sources of funding?
- 13-7 How are the RCDF interventions to be sustained?
- 13-8 What opportunities are available for working with other rural focused initiatives and development partners?
- 13-9 What derived policy is necessary to operationalize the higher level policy and /or policy objectives of government?
- 13-10 How will impact and success be measured?
- 13-11 What is the policy formulation process?

13-1 How did the reform process to achieve Universal Access start in Uganda?

Rural communications development is a challenge faced by all LDCs as well as many transition economy countries. There can be no successful prescriptive models because each country will have unique local conditions, needs, and limitations (social, economic and political). Good policy and strategy processes can however be replicated, increasing the potential for success.

No Successful Prescriptive Model

This chapter uses the Uganda case, where rural communications policy was tailored rather than prescribed, to outline what the author considers key issues in the formulation and implementation of the policy.

Good policy and strategy processes can however be replicated

The starting point for Uganda's Rural Communications Development (RCD) Policy (RCDP), and Fund (RCDF) was the law: The Uganda Communications Act (1997) required Uganda Communications Commission (UCC) to establish a Rural Communications Development Fund. There was no prior detailed statement of policy objectives other than the general policy statement: "increase the geographical distribution and coverage of services throughout the country".

The nature of the telecommunications sector reform process in Uganda was such that reform started before the development of both a holistic sector policy and a rural

communications development policy. The recognition for the need to increase geographical coverage was however captured in the national licenses granted to the two duopoly operators through the imposition of roll out obligations by geographical region. These roll out obligations, which informed the rural communications development strategy, are not discussed in this paper.

Reference:

Tusubira, F.F. (2004), “Rural Communications Development - The Uganda Case” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

13-2 What does rural mean?

“Rural” has different meanings and consequences in different countries.

The meaning of “rural” needs to be put in context. In developed economies, it often means sparsely populated and rich, and occasionally sparsely populated and poor. In LDCs, it almost always means poor, whether densely or sparsely populated. It is clear then that the nature of intervention and the sustainability challenges will change according to context. It is also clear that it is wrong to import solutions without knowing the context in which they were implemented.

Rural is synonymous with poor.

This still needs to be qualified. The intent of government policy is clearly to address access for those citizens whose income levels (or location) keep them out of the telecommunication environment. Since the majority of Ugandans live below the poverty line, regardless of whether they are rural or urban, the concern became national rather than a simple distinction of rural and urban in the dictionary sense. The rural environment then becomes an additional rather than a defining challenge in addressing the needs of the rural poor as opposed to the urban poor, as do sparse populations.

By recognising “rural” as being synonymous with “poor”, UCC, under the RCDF, is able to address the needs of the core poor, many of whom live in urban or peri-urban areas. Granted: they have more opportunities than

the core rural poor, but they normally exist in much worse conditions.

What would Rural mean in your country?

Reference:

Tusubira, F.F. (2004), “Rural Communications Development - The Uganda Case” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

13-3 What are the needs of the rural communities and how can the RCDF be used to address them?

There is a common and rather arrogant assumption that rural communities in LDCs, who by the same token are often illiterate or semi-literate, do not know what they want. Technocrats tend to use an academic identification of what they see as the challenges and prescribe solutions (much as multi-lateral agencies sometimes prescribe solutions for LDCs).

Needs of the communities need to be defined with community participation

Rural communities only need to learn about the opportunities offered by technology in enabling their activities. They have the wisdom after that to put technology to use. Apart from leading to solutions that are more likely to succeed, engagement of rural communities also promotes ownership and sustainability.

Commonality of underlying challenges in most rural communities.

The high level information needs vary from community to community. These range from information that will address health problems to information that will lead to better production and marketing for the economic activities in each area. In identifying the common underlying challenges, it is important to use sample surveys that capture the key economic activities in the rural areas of the country, including details of income and expenditure patterns.

It is the common underlying challenges related to telecommunications that the RCD should seek to address. The value of the RCD intervention will not be felt unless the high level information needs are addressed. It is

important to link up with sector ministries (e.g. health, agriculture, education, etc) to ensure that initiatives that will bring this value are implemented. The RCDF can be easily uselessly spread thin by trying to do too much.

In Uganda, the common challenges were found to be ICT awareness, ICT literacy, access, and affordability

Reference:

Tusubira, F.F. (2004), “Rural Communications Development - The Uganda Case” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

13-4 What are the key components of the RCDP if it is to add value to the human development process?

Whether or not it is explicitly stated, RCD in all countries is aimed at creating equity of opportunity leading to improved human development. It is therefore important that the RCDP captures human development concerns and targets.

These must relate to the identified common underlying challenges for the rural poor. This demands that policy-makers and regulators understand human development and its challenges in order to translate general policy statements to a good RCDP whose performance can be objectively evaluated. A good starting point, even if there is no formal country framework, is the Millennium Development Goals (MDGs).

Each common challenge leads to a key component of the RCDP

Having identified the common challenges, the areas and strategy of intervention need to be formulated. The following common challenges and interventions were adopted under Uganda's RCDP:

- **Awareness and literacy:** Support a vanguard training institution in each district to create literacy and awareness about the potential of ICT; support district portals to demonstrate some benefits and use through relevant content;
- **Access:** Support an Internet POP in each district; set up a national IXP; ensure a phone in each sub-county (the smallest local administrative unit in Uganda); and

- **Affordability:** Give outright one-off grants to small start-ups and partial one-off grants to bigger rural operators; permit or require asymmetrical interconnection settlements in favour of rural telecomm operators.

RCDP should never be formulated purely around infrastructure.

One important consideration is that RCDP should never be formulated purely around infrastructure. The best water reticulation system is useless without water. Having water that is not used also does not help. The questions are: Can the people afford the water delivered over the system? Is the water being put to good use? Has the incidence of disease been reduced by the availability of water? In Uganda, it should be noted that human development objectives did not play their rightful role in policy formulation, but this is now being addressed and will give new focus on the RCDP.

Exercises:

- (1) Look at the latest UNDP Human Development Report (2004) to note and understand the indices normally used for comparing development and poverty. Note the performance of your country.
- (2) Look at and discuss/internalize the MDGs as they relate to your country. Discuss your country's progress towards achieving the targets (the UNDP Human Development Report 2004 should provide the data you need).
- (3) With reference to the common challenges identified in 13-3, propose interventions for your country, explaining why each intervention is proposed and how it supports response to the challenges of human development.

Reference:

Tusubira, F.F. (2004), “Rural Communications Development - The Uganda Case” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

13-5 What is the envisaged delivery strategy?

The regulator specializes in regulation. Do they have the capacity to oversee RCD? Additionally, the spectrum of direct

stakeholders in RCD is different from the normal direct stakeholders in regulation. Government departments focused on rural development and marginalized groups also need to be involved.

Institutional arrangements for RCD Implementation

In Uganda, a separate Board was set up under the UCC. Apart from policy guidance and monitoring oversight from UCC, this Board operates independently.

Delivery Arrangements

Then the delivery arrangements (i.e., who carries out the actual implementation) must be defined. There are various alternatives: NGO-led implementation; Public-Private Partnerships (PPP) in funding and operation or through funding only with operations led by the private sector, etc. There is no standard best approach: the approach will be governed by the social, political and economic environments.

Uganda has focused on one-off grants to the private sector (and community based organisations) because of the long history of failure by public enterprises, and the excellent record of private sector and CBO performance over the last ten years

Reference:

Tusubira, F.F. (2004), "Rural Communications Development - The Uganda Case" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

13-6 The Master Plan:

What are the targets, cost projection, timeline, priorities, and sources of funding?

If a holistic national ICT policy (in some countries, separate but related communications and IT policies) is in place, it will most likely have some policy targets for the different interventions. It will otherwise be necessary to evolve these through a consultative process.

For the proposed interventions, the targets, cost projections, and priorities must be worked. The targets will lead to cost projections for the entire country. Recognising that RCD is a major undertaking, and that funding will be

limited, the proposed interventions, as well as the geographical areas where they will be implemented, need to be prioritised.

The timeline will be controlled by operationalization strategy and sources of funding. It is often desirable to pilot major initiatives, and the time line has to allow for this. Starting in areas where there is high potential for quick-wins is also desirable in that it brings confidence and helps in mobilizing funding. The required level of funding and the timeline drive each other: what is desirable in terms of the timeline is driven by what is realistic in terms of projected funding capacity. Proposed interventions might also have to be scaled down to have realistic projects that can be implemented in a well-defined time frame.

Some sources of funds, eg the World Bank, are normally subject to long procedural delays and will indeed delay overall implementation. It is critical that the primary source of funding is identified during the policy formulation process. In most countries that have reformed the sector, a levy on the income of service providers would have been made part of the law and license condition as a universal service or access fund. The primary source of funding can be used to leverage funding from development partners, multi-lateral agencies, and the private sector.

In Uganda, a 1% levy on all telecom service providers is the main funding driver for the RCDF. Development partners: IDRC supported the policy and strategy research; the World Bank has given a \$5,000,000.

Reference:

Tusubira, F.F. (2004), "Rural Communications Development - The Uganda Case" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

13-7 How are the RCDF interventions to be sustained?

It is a noted short-coming in many developing countries that projects fizzle out as soon as the initial funding runs out. This is often caused by failure to address sustainability issues prior to project implementation. A good guiding principle is that an initiative that has no

demonstrable means of sustainability should never be funded.

Community Engagement Critical to Sustainability

A key premise with RCD is that if communities are engaged in the definition of required intervention, the intervention will be sustainable in the medium to long term. Sustainability is not necessarily through individuals meeting recurrent costs; it could be through prior agreement of communities or local government collectively meeting or subsidizing cost of what could be classified as a social service.

Sustainability is a key component of project evaluation

In Uganda, the decision was that the RCDF would not be used for recurrent support, rather one-off support to address the short-term profitability demands in areas that were not commercially viable in the short-term. Demonstration of own funding input as well as a good sustainability plan has been a key evaluation criterion whenever proposals for support from the RCDF have been invited.

One exception was made in the case of District portals, where there was agreement about RCDF meeting the recurrent costs for an initial period, with local governments undertaking to assume the cost of content update and hosting after the initial period.

Reference:

Tusubira, F.F. (2004), "Rural Communications Development - The Uganda Case" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

13-8 What opportunities are available for working with other rural focused initiatives and development partners?

Lack of national-level coordination of development initiatives that are supported through public funding is another noted weakness in many developing countries.

Creating synergy through linkage with other policy initiatives.

Opportunities for creating synergy and avoidance of duplication of efforts are therefore often missed. Some common

initiatives relate to rural electrification, health, agriculture, education, and local government. A survey of such initiatives at the conceptualization and planning stages provides good input on such opportunities.

Working with other sectors enables the definition of common pilot areas.

Marshalling funds that would have been dispersed or used to duplicate efforts into a single initiative, need to be agreed on at the planning stage. This does have challenges of coordination and linking funding from multiple sources. Secondly, the timelines for different initiatives might be significantly different

Gap in coordination should be addressed

Unfortunately, this level of coordination was done to only a limited extent in Uganda in the linkage with rural electrification. Indeed the \$5million from the World Bank came from Uganda's energy for rural electrification funding. Discussions are now under way with other sectors so that this gap can be addressed at the review cycle starting 2005.

Reference:

Tusubira, F.F. (2004), "Rural Communications Development - The Uganda Case" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

13-9 What derived policy is necessary to operationalize the higher level policy and /or policy objectives of government?

Any major initiative like RCD requires a clear policy to define and set the operational boundaries and norms. It is unlikely that the higher level government policy on RCD will detail all the issue discussed in 13-7 above. The implementing agency will then have to develop and adopt a formal public policy --- The Rural Communications Development Policy (RCDP).

UCC, after the initial conceptualization, saw this as the major first step. The challenge of RCD was seen by UCC as a priority right from the start. A proposal was developed to IDRC for support in developing a Rural Communications Development Policy and Strategy that would address all the conceptual issues.

Reference:

Tusubira, F.F. (2004), "Rural Communications Development - The Uganda Case" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

13-10 How will impact and success be measured?

Monitoring and evaluation (M&E) are critical elements of the implementation strategy. Unfortunately, M&E has been ignored or given only passing consideration in many public policies. M&E helps to identify successes and failures, pointing the direction to improvement in policy or strategy or replication and scaling up.

The theory of change is must be thought through to enable effective M&E

Development impact of a single intervention is often difficult to isolate and evaluate, especially in the presence of multiple initiatives, as will often be the case. The challenge is then to identify indicators linked to a clear theory of change, so that such indicators can be assumed measures of successful intervention. M&E should focus a lot on the process, rather than simply the outputs.

Impact evaluation will often needs an independent agent.

An independent agent looks in from the outside, performing a process audit and identifying areas of weakness or failing that need to be addressed. The audit should inform the process on a continuing basis so that adjustments can be made before resources and time are lost unnecessarily.

Important to assess impact rather than deliverables

Uganda has a component under RCDF for assessing the success of each intervention. There is however a short-coming in that this assessment is ad hoc, based more on achieving the grant deliverables rather than impact.

There is no defined basis that would help UCC to know if the intent of the intervention has been achieved. This weakness will be addressed in the new cycle.

Reference:

Tusubira, F.F. (2004), "Rural Communications Development - The Uganda Case" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

13-11 What is the policy formulation process?

Stakeholder ownership is a key ingredient of successful policy and strategy, making stakeholder engagement and extensive consultations critical. This statement can be made for all cases of public policy, and RCDP is no exception. The best policy is useless if it is not accepted and owned by the stakeholders. This means that time must be spent during the planning process on consultations, focus group discussions, field interviews, and stakeholder workshops.

Another important component is research that establishes reliable baseline data that supports policy and strategy development. Uganda conducted a study using an external consultant funded by IDRC and local researchers from the Makerere Institute for Social Research.

Learning from best practices (and failures) increases the chances of success. Sustainable policy requires capacity development, rather than perpetual reliance on external consultants who often do not understand the local environment.

Reference:

Tusubira, F.F. (2004), "Rural Communications Development - The Uganda Case" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

RURAL COMMUNICATIONS DEVELOPMENT – THE UGANDA CASE

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1. INTRODUCTION

Rural communications development is a challenge faced by all LDCs as well as many transition economy countries. There can be no successful prescriptive models because each country will have unique local conditions, needs, and limitations (social, economic and political). Good policy and strategy processes can however be replicated, increasing the potential for success.

This paper uses the Uganda case, where rural communications policy was tailored rather than prescribed, to outline what the author considers key issues in the formulation and implementation of the policy.

The starting point for Uganda's Rural Communications Development (RCD) Policy (RCDP), and Fund (RCDF) was the law: The Uganda Communications Act, 1997, required UCC to establish a Rural Communications Development Fund. There was no prior detailed statement of policy objectives other than the general policy statement: "increase the geographical distribution and coverage of services throughout the country".

The nature of the telecommunications sector reform process in Uganda was such that reform started before the development of both a holistic sector policy and a rural communications development policy. The recognition for the need to increase geographical coverage was however captured in the national licenses granted to the two duopoly operators through the imposition of roll out obligations by geographical region. These roll out obligations, which informed the rural communications development strategy, are not discussed in this paper.

2. LEARNING OUTCOMES

After working through this presentation and associated notes and references, the reader,

assumed to be from a country that is planning to implement a rural communications development policy, will be able to:

- 2.1 Articulate the policy and strategy challenges of RCD.
- 2.2 Conceptually think through the process of RCDP formulation as it applies to the particular country.
- 2.3 Critique the approaches used by different countries in relation to their environments.
- 2.4 Guide the formulation of a rural communications development policy and strategy.
- 2.5 Develop a rural communications development master plan.

3. REFERENCE MATERIALS

- The UNDP Human Development Report (2004)
- The Uganda Communications Commission, "Rural Communications Development Policy for Uganda", July 2001. <http://www.ucc.co.ug/rcdf/about.html>
- M Shirley, F F Tusubira, Frew Gebreab, and Luke Haggarty, "Telecommunications Reform in Uganda", World Bank Development Research Group, Policy Working Paper 2864, June 2002. <http://www.researchictafrica.net/>. (Follow the link to Policy under Resources)
- F F Tusubira, I Kaggwa, F Mukholi, "The Uganda Telecommunications Sector Performance Review, 2003". <http://www.researchictafrica.net/>. (Link to Sector Performance Reviews).

4. DISCUSSION OF THE KEY POLICY, STRATEGY, AND PROCESS QUESTIONS

4.1 What does "rural" mean?

- *“Rural” has different meanings and consequences in different countries.*

The meaning of “rural” needs to be put in context. In developed economies, it often means sparsely populated and rich, and occasionally sparsely populated and poor. In LDCs, it almost always means poor, whether densely or sparsely populated. It is clear then that the nature of intervention and the sustainability challenges will change according to context. It is also clear that it is wrong to import solutions without knowing the context in which they were implemented.

- *In Uganda, “rural” is synonymous with poor (both dense and sparse populations).*

This still needs to be qualified. The intent of government policy is clearly to address access for those citizens whose income levels (or location) keep them out of the telecommunication environment. Since the majority of Ugandans live below the poverty line, regardless of whether they are rural or urban, the concern became national rather than a simple distinction of rural and urban in the dictionary sense. The rural environment then becomes an additional rather than a defining challenge in addressing the needs of the rural poor as opposed to the urban poor, as do sparse populations.

- *Poverty leads to affordability concerns*

By recognising “rural” as being synonymous with “poor”, UCC, under the RCDF, is able to address the needs of the core poor, many of whom live in urban or peri-urban areas. Granted: they have more opportunities than the core rural poor, but they normally exist in much worse conditions.

Exercise: What would “rural” mean in your country?

4.2 What are the needs of the rural communities and how can the RCDF be used to address them?

- *The needs of the communities need to be defined with community participation.*

There is a common and rather arrogant assumption that rural communities in LDCs, who by the same token are often illiterate or semi-literate, do not know what they want. Technocrats tend to use a desk identification of what they see as the challenges and prescribe solutions (much as multi-lateral agencies sometimes prescribe solutions for LDCs).

Rural communities only need to learn about the opportunities offered by technology in enabling their activities. They have the wisdom after that to put technology to use. Apart from leading to solutions that are more likely to succeed, engagement of rural communities also promotes ownership and sustainability.

- *There tends to be a commonality of underlying challenges in most rural communities.*

The high level information needs vary from community to community. These range from information that will address health problems to information that will lead to better production and marketing for the economic activities in each area. In identifying the common underlying challenges, it is important to use sample surveys that capture the key economic activities in the rural areas of the country, including details of income and expenditure patterns.

- *It is the common underlying challenges related to telecommunications that the RCD should seek to address.*

RCD should only address the common underlying challenges, but with full awareness of the high level information needs. The real value of the RCD intervention will not be felt unless the high level information needs are addressed, not by the RCDF, but by the sector ministries (e.g. health, agriculture, education, etc). This underscores the importance of multi-sectoral approaches to rural development.

- *In Uganda, the common challenges were found to be ICT awareness, ICT literacy, access, and affordability*

Exercise: By taking on community roles in a discussion group, identify the common challenges in your country where intervention through the RCD would promote human development.

4.3 What are the key components of the RCDP if it is to add value to the human development process?

- *The key components must respond to the identified common underlying challenges of the poor.*

Whether or not it is explicitly stated, RCD in all countries is aimed at creating equity of opportunity leading to improved human development. It is therefore important that the RCDP captures human development concerns and targets. This demands that policy makers and regulators understand human development and its challenges in order to translate general policy statements to a good RCDP whose performance can be objectively evaluated. A good starting point, even if there is no formal country framework, is the millennium development goals.

- *Each common challenge leads to a key component of the RCDP*

Having identified the common challenges, the areas and strategy of intervention need to be formulated. The following common challenges and interventions were adopted under Uganda's RCDP:

- Awareness and literacy: support a vanguard training institution in each district to create literacy and awareness about the potential of ICT; support district portals to demonstrate some benefits and use through relevant content;
- Access: Support an internet PoP in each district; set up a national IXP; ensure a phone in each sub-county

(the smallest local administrative unit in Uganda)

- Affordability: give outright one off grants to small start-ups and partial one off grants to bigger rural operators; permit or require asymmetrical interconnection settlements in favour of rural telecomm operators.

- *An important consideration is that RCDP should never be formulated purely around infrastructure.*

The best water reticulation system is useless without water. Having water that is not used also does not help. The questions are: Can the people afford the water delivered over the system? Is the water being put to good use? Has the incidence of disease been reduced by the availability of water?

In Uganda, it should be noted that human development objectives did not play their rightful role in policy formulation, but this is now being addressed and will give new focus on the RCDP.

Exercises:

- (i) Look at the latest UNDP Human Development Report (2004) to note and understand the indices normally used for comparing development and poverty. Note and discuss the performance of your country.
- (ii) Look at and discuss/internalize the millennium development goals as they relate to your country. Discuss your country's progress towards achieving the targets (the UNDP Human Development Report 2004 should provide the data you need).
- (iii) With reference to the common challenges identified in 3.3, propose interventions for your country, explaining why each intervention is proposed and how it supports response to the challenges of human development.

4.4 What is the envisaged delivery strategy?

- *The institutional arrangements for implementation of RCD must be defined.*

The regulator specializes in regulation. Do they have the capacity to oversee RCD? Additionally, the spectrum of direct stakeholders in RCD is different from the normal direct stakeholders in regulation. Government departments focused on rural development and marginalized groups also need to be involved. In Uganda, a separate Board was set up under the Uganda Communications Commission, with representation from the Consumers, the Ministry responsible for Communications, the service providers, the Ministry responsible for Local Government, and the Uganda Institution of Professional Engineers. Apart from policy guidance and monitoring oversight from UCC, this Board operates independently.

- *The delivery arrangements (i.e., who carries out the actual implementation) must be defined.*

There are various alternatives: NGO led implementation; public and private sector partnerships (in funding and operation or through funding only with operations led by the private sector), etc. There is no standard best approach: the approach will be governed by the social, political and economic environments.

Uganda has focused on one off grants to the private sector (and community based organisations) because of the long history of failure by public enterprises, and the excellent record of private sector and CBO performance over the last ten years
Exercise: Discuss the merits and demerits of various delivery strategies in your country, and recommend what you would consider the best approach.

4.5 The Master Plan: What are the targets, cost projection, timeline, priorities, and sources of funding?

- *For the proposed interventions, the targets, cost projections, and priorities must be defined.*

If a holistic national ICT policy (in some countries, separate but related communications and IT policies) is in place, it will most likely have some policy targets for the different interventions. It will otherwise be necessary to evolve these through a consultative process. The targets will lead to cost projections for the entire country. Recognising that RCD is a major undertaking, and that funding will be limited, the proposed interventions, as well as the geographical areas where they will be implemented, need to be prioritised.

- *The timeline will be controlled by the operationalisation strategy and sources of funding.*

It is often desirable to pilot major initiatives, and the time line has to allow for this. Starting in areas where there is high potential for quick-wins is also desirable in that it brings confidence and helps in mobilizing new funding.

The required level of funding and the timeline drive each other: what is desirable in terms of the timeline is driven by what is realistic in terms of projected funding capacity. Proposed interventions might also have to be scaled down to have realistic projects that can be implemented in a well defined time frame.

Some sources of funds, eg the World Bank, are normally subject to long procedural delays and will indeed delay overall implementation. This has happened in Uganda.

- *Identify funding sources and mixes*

It is critical that the primary source of funding is identified during the policy formulation process. In most countries that have reformed the sector, a levy on the income of service providers would have been made part of the law and license conditions as a universal service or access fund. The primary source of funding should be used to leverage funding from development partners, multi-lateral agencies, and the private sector.

In Uganda, a 1% levy on all telecom service providers is the main funding driver

for the RCDF (\$4.44m collected to date). Development partners: IDRC supported the policy and strategy research (Canadian \$200,000); the World Bank has given a grant of \$5 million towards actual implementation.

Disbursement started 18 months ago. Part of the levy (about \$1.2m) collected has been set aside as counterpart funding for the World Bank grant. Another \$920,000 has been disbursed to internet points of presence (\$250,000); public pay phones (\$143,000); ICT training (\$288,000); internet cafes (\$162,000). The resulting private sector contribution as a result of subsidy incentives is \$ 842,000 to date: \$250,000 to internet PoPs; \$143,200 to public pay phones; \$288,000 to ICT training; \$162,000 to internet cafes. Private sector contribution is projected to rise to \$8m and above when the major components supported by the World Bank grant are implemented. Arithmetic show that the \$4.44m of the RCDF to date will leverage an additional \$13m into RCD.

4.6 How are the RCDF interventions to be sustained?

- *Sustainability must be addressed at the planning stage.*

It is a noted short-coming in many developing countries that projects fizzle out as soon as the initial funding runs out. This is often caused by failure to address sustainability issues prior to project implementation. A good guiding principle is that an initiative that has no demonstrable means of sustainability should never be funded.

- *Community engagement at the planning stage is critical to sustainability.*

A key premise with RCD is that if communities are engaged in the definition of required intervention, the intervention will be sustainable in the medium to long term. Sustainability is not necessarily through individuals meeting recurrent costs; it could be through prior agreement with communities or local government

collectively meeting or subsidizing cost of what could be classified as a social service.

- *Sustainability is a key component of project evaluation.*

In Uganda, the decision was that the RCDF would not be used for recurrent support, rather one off support to address the short-term profitability demands in areas that were not commercially viable in the short term. Demonstration of own funding input as well as a good sustainability plan has been a key evaluation criterion whenever proposals for support from the RCDF have been invited.

One exception was made in the case of District portals, where there was agreement about RCDF meeting the recurrent costs for an initial period of two years, with local governments undertaking to assume the cost of content update and hosting after the initial period.

4.7 What opportunities are available for working with other rural development initiatives and development partners?

- *Where there are development challenges, many opportunities exist for creating synergy through linkage with other policy initiatives.*

Lack of national level coordination of development initiatives that are supported through public funding is another noted weakness in many developing countries. Opportunities for creating synergy and avoidance of duplication of effort are therefore often missed. Some common initiatives relate to rural electrification, health, agriculture, education, and local government. A survey of such initiatives at the conceptualization and planning stages provides good input on such opportunities.

- *Working with other sectors enables the definition of common pilot areas.*

Marshalling funds that would have been dispersed or used to duplicate efforts into a single initiative needs to be agreed at the planning stage. This does have challenges

of coordination and linking funding from multiple sources. Secondly, the timelines for different initiatives might be significantly different.

In Uganda, the following initiatives were recognized and taken into account:

- The Poverty Eradication Plan
- Universal Primary Education
- The Uganda Information Infrastructure Agenda
- National ICT Policy Development
- Plan for the Modernisation of Agriculture
- Improvement of Delivery of Health Services

Unfortunately, while these were recognized in Uganda's RCDP, there is framework for coordination, with the exception of the Energy for Rural Transformation (ERT – which actually came on board after the RCDP was formulated): Indeed the \$5million from the World Bank came from Uganda's ERT allocation. This gap will be addressed during the first review cycle starting 2005.

Exercise: Identify the initiatives aimed at rural development and/or poverty eradication in your country, and link them to the millennium development goals. Propose ways in which these can interface with rural communications development.

4.8 Why is policy necessary to operationalise the higher level objectives of government?

- *Any major initiative like RCD requires a clear policy to set direction and objectives, and to define the operational boundaries and norms.*

Even where they exist, it is unlikely that the higher level government policy objectives on RCD will detail all the issues discussed in 1 – 7 above. The implementing agency (UCC in Uganda) will then have to develop and adopt a formal public policy – The Rural Communications Development Policy.

- *UCC, after the initial conceptualization, saw the development and adoption of the RCDP and Strategy as the major first step.*

The challenge of RCD was seen by UCC as a priority right from the start. A proposal was submitted to the International Research Development Corporation (IDRC) of Canada for support in developing a Rural Communications Development Policy and Strategy that would address all the conceptual issues.

The policy developed covers the following:

- The objectives of RCD
- Policy actions necessary to achieve the objectives
- Policy on the provision of basic services
- Policy on tariffs for rural communication services
- Policy on special interconnection

The strategies for implementing the policy were also addressed:

- Establishment and administration of the RCDF
- Development of a manual of procedure
- Disbursement policy
- Access to radio frequencies
- Policy actions on sources of funds
- Priority areas and fund program for the initial period

4.9 How will impact and success be measured?

- *Monitoring and evaluation are critical elements of the implementation strategy.*

Unfortunately, M&E is ignored or given only passing consideration in many public policies in LDCs. M&E helps to identify successes and failures, pointing the direction to improvement in policy and strategy, and/or replication and scaling up.

- *The theory of change is must be thought through to enable effective M&E*

Development impact of a single intervention is often difficult to isolate and evaluate, especially in the presence of multiple initiatives, as will often be the case. The challenge is then to identify indicators linked to a clear theory of change, so that

such indicators can be assumed measures of successful intervention. M&E should focus a lot on the process, rather than simply the outputs.

- *Impact evaluation will often need an independent agent.*

An independent agent looks in from the outside, performing a process audit and identifying areas of weakness or failing that need to be addressed. The audit should inform the process on a continuing basis so that adjustments can be made before resources and time are lost unnecessarily.

UCC made a provision for M&E in the RCDP and indeed talks about the socioeconomic impact. The later, which would have been of great value, was however not thought through. Current assessment is based on achieving the grant deliverables rather than impact. There is no defined basis that would help UCC to know if the intent of the intervention has been achieved. This weakness will be addressed in the new cycle.

5.1 What is the policy formulation process?

- *Stakeholder ownership is a key ingredient of successful policy and strategy, making stakeholder engagement and extensive consultations critical.*

This statement can be made for all cases of public policy, and RCDP is no exception. The best policy is useless if it is not accepted and owned by the stakeholders. This means that time must be spent during the planning process on transparent consultations using focus group discussions, field interviews, and stakeholder workshops.

- *Another important component is research that establishes reliable baseline data that supports policy and strategy development.*

Uganda conducted a study using an external consultant funded by IDRC and local researchers from the Makerere Institute for Social Research.

- *Learning from best practices (and failures) increases the chances of success.*

This was a key element of the RCDP development process in Uganda. A key challenge here is being able to think outside the box. There is one simple example in Uganda where it was demonstrated that contrary to popular belief, and even with higher tariffs, a simple rural telecommunication service is sustainable. This set the direction of thinking in the development of the RCDP, going for small start-ups that would be sustainable, and that would scale up under their own earnings, rather the large, unsustainable multi-purpose tele-centers.

- *Sustainable policy management requires capacity development, rather than perpetual reliance on external consultants who often do not understand the local environment.*

This is again part of the process and a continuing challenge for LDCs. Policy must evolve as conditions change, and sustainable policy management requires that LDCs develop the capacity for policy synthesis and analysis. The formulation of policies like the RCDP provide an opportunity for capacity building that UCC took full advantage of by requiring the direct involvement of local researchers.

5.2 Conclusion

While Uganda's RCDP is still in the early stages of implementation, UCC is satisfied that it is a policy that has been developed and owned taking into account the key content and process issues.

The initial targets were modest to permit a learning curve and policy and strategy refinement before more ambitious targets are set: The policy and strategy are not static, and have built in reviews every two years. Implementation started at the end of 2002, and the first review cycle, taking into account the observed weaknesses and short-comings, has started.

UCC has full confidence in the success of the policy, and believes it has valuable lessons and experience to pass on.

Part IV Technologies

Universal Access	
Question 11. Development of Telecommunications Infrastructure	
What is the current state of telecommunication infrastructure?	
Level 1.	Telecommunications services are not available except for a few largest cities. People have to resort to satellite connection in the rural areas.
Level 2.	There are national telecoms trunk lines (backbone) which connect major regional centers of the country
Level 3.	Telephone trunk line (backbone) covers most of the regions within the country. Most rural areas can be covered by wireless local loops from the backbone.
Level 4.	There are a few rural telecoms service providers operating wireless and/or satellite based telecoms services in the rural areas.
Level 5.	All people living in rural areas have access to telephone lines.
Question 12. Current State of the Internet Service	
What is the government policy to promote the Internet and introduce competition in the ISP market?	
Level 1.	Internet service is available only in a few largest cities in the country. Internet Service Provider is a state monopoly.
Level 2.	Internet service is available in most of the regional center cities. There are a few ISPs providing basic access services. ISPs are subject to individual licensing requirement. Customers are not free to choose an ISP. Rates are high and terms are very strict.
Level 3.	Internet service is available in the rural areas which are in the vicinity of large cities. Several ISPs are offering individual and business access services. ISPs are subject to class license. Customers are free to choose an ISP, but only regulated service/pricing packages are available.
Level 4.	There are a large number of internet service providers which provide service to rural areas. ISPs offer basic access, contents and other services. The ISP market is competitive, but limited in terms of types of services allowed.
Level 5.	Most of the rural areas have access to the Internet through various technologies. Broad band connection is available in the large cities. Multitude of providers of which cater to specialized requirements. ISPs are subject to normal competition rules. Customers enjoy full freedom to choose an ISP, and access networks and types of service.

Chapter 14 Technologies for Rural Connectivity

Rural connectivity requires a backbone transmission lines and a technologies to connect to individual end users. Technologies include wireless local loops, cellular phones, and satellites. What are the characteristic of each technology? What are the best choices for different situations?

Curriculum Topics:

- 14-1 What are the requirements for communications system in rural areas?
- 14-2 What are the choices of technologies for communications in rural areas?
- 14-3 What is the advantage of wireless technologies for communications in rural areas?
- 14-4 What are the merit and demerit of satellite and terrestrial wireless technologies
- 14-5 Is there new technologies available for rural applications
- 14-6 How to reduce the cost for the communications in rural areas?
- 14-7 What applications are needed in rural areas?
- 14-8 What are the barriers for communications in the environment of rural areas?
- 14-9 How to finance the rural projects?
- 14-10 What are the general concerns when rural communications projects are implemented?

14-1 What are the requirements for communications system in rural areas?

More than 40% of the world population live in rural and remote areas of developing countries. Since the Independent Commission for World Wide Telecommunications Development, chaired by Sir Donald Maitland identified the communications gap between “haves” and “have-nots” in its Missing Link report (1985), the concept of the digital divide was acknowledged in the activities of the ITU.

ITU began study of rural telecommunication technologies

The particular attention was paid for the development of communications for rural and remote areas when the second World Telecommunications Development Conference (March 1998, Valleta, Malta) agreed upon the topic of “Study various mechanism by which to promote the development of new telecommunication technologies for rural applications” and decided to promote the activities of telecommunications development for rural areas. The telecommunications development

in general was reiterated in many occasions, however, the development of rural and remote areas of developing countries are more specific than the development of urban areas of the developing countries.

Report on New Technologies for Rural Applications (2003)

The Rapporteur’s Group for the question on communications for rural and remote areas made a global survey on rural communications in 1993 and the report was issued as Document No.111 SG2 ITU-D. The presentation annexed in this chapter reflects the results of analysis of global survey and the final report of ITU-D Focus Group 7 titled “New Technologies for Rural Applications.”

Reference:

Kawasumi, Yoshihiko (2004), “Optimal Technologies to Connect Rural Communities” Presentation for the International Seminar on ICT Policy Reform & Rural Communication Infrastructure

14-2 What are the choices of technologies for communications in rural areas?

The number of users of fixed service of the world was exceeded by that of mobile service in 2002. The number of users of fixed service is 12.1 billion (projection at the end of 2003) compared with 13.29 billion (projection at the end of 2003) for that of mobile service. It is true even in the developing countries that there are more mobile phone users than the fixed telephone users.

Number of mobile phone exceeds that of fixed line phones

However, the 2nd Generation (2G) mobile phone services in developing countries are growing rapidly in their urban areas among the people of comparatively high income. However, there is a success story of Grameen Telecom in Bangladesh, which introduced rental mobile phone scheme for the village women to share the use of phones among the village people of low income with affordable commission to be paid to the women who rented the phone.

Satellite system is suited to large size developing countries

Satellite system (VSAT) is suited to the large size developing countries to provide connectivity to the widely spread rural villages. The cost of satellite transponder is said to be too high for the rural villages to sustain the operation after the launch of communications services.

Copper Wires

Copper wires including the transmission system over power line may be available for rural and remote areas within the accessible range.

Terrestrial Wireless Communication Technologies

Terrestrial wireless communications technologies, such as LMDS, VHF Radio, PHS-WLL, WiFi, CDMA450, are considered most suited to provide connectivity to the communities of rural and remote areas. There are a variety of technologies for the trunk line implemented in the developing countries. The terrestrial wireless technology may also provide connectivity between the nearest regional centers and rural communities in most cases however VSAT system should be taken into account in large-size countries.

Reference:

Kawasumi, Yoshihiko (2004), "Optimal Technologies to Connect Rural Communities" Presentation for the International Seminar on ICT Policy Reform & Rural Communication Infrastructure

14-3 What is the advantage of wireless technologies for communications in rural areas?

When using terrestrial wireless systems in sparsely populated rural areas, the use of low frequency bands --- typically under 1GHz --- is often necessary in order to achieve sufficient coverage to make the provision of services economically viable. The lower the frequency band, the longer the range will be at a given power level. For example, a GSM station operating in the 400MHz band can cover five times the area of GSM base station operating at 1,800 or 1,900 MHz.

Wireless technologies have the following merits:

- Significant Lifetime Cost Benefits: Wireless technologies provide significant life time cost benefits in rural areas in cases where cable deployment is uneconomic.
- Easy Installation & Smaller Incremental Cost: They provide easy and speedy installation in harsh terrain and extremely remote areas, smaller investment increments and avoidance of copper cable theft.
- Lower Maintenance Cost: They provide lower maintenance cost and greater network flexibilities

Reference:

Kawasumi, Yoshihiko (2004), "Optimal Technologies to Connect Rural Communities" Presentation for the International Seminar on ICT Policy Reform & Rural Communication Infrastructure

14-4 What are the merit and demerit of satellite and terrestrial wireless technologies?

In some countries, satellite transponder is provided for the specific purposes such as education and medical services in the country

and its adjacent countries with reduced cost. Such arrangements may be developed in the large size countries and in their adjacent countries for the services in the rural and remote areas of the associated countries. In most of the developing countries, the terrestrial wireless technology of various types may best suited for the rural and remote areas from economical, technical and operational reasons:

- Huge investment cost for satellite system;
- High operation and maintenance cost for satellite system; and
- High transponder cost for satellite system

Reference:

Kawasumi, Yoshihiko (2004), “Optimal Technologies to Connect Rural Communities” Presentation for the International Seminar on ICT Policy Reform & Rural Communication Infrastructure

14-5 Is there new technologies available for rural applications?

The final report of ITU FG7 recommended the Wireless LAN technology as low-cost technology to be deployed in rural and remote areas of the developing countries.

Wireless Fidelity (WiFi)

The technology is known as WiFi based on the IEEE 802.11 b/g standard in later date. The technology is now introduced in the metropolitan hectic areas of developed countries at so-called hotspots such as airports, hotels, railway stations, etc., and facilitates to provide easy and low-cost, high-speed Internet connections for the PC, PDA, and mobile IP phone users.

Rural application of WiFi advancing in Japan

Implementation of this technology for various applications including e-health and tele-education, e-administration, etc. for rural communication development in Japan has been promoted since more than several years ago by local governments in collaboration with potential community practitioner groups, network operators, or service operators and product suppliers. More than 150 towns and villages in the rural and remote areas of Japan introduced such new technology.

The frequency spectrum for the system is unlicensed ISM band (2.4Ghz)

The frequency spectrum used for this technology is 2.4Ghz, which is internationally approved for use as Industrial, Scientific and Medical (ISM) Band. Higher frequency band is also envisaged to meet with increasing demand.

Reference:

Kawasumi, Yoshihiko (2004), “Optimal Technologies to Connect Rural Communities” Presentation for the International Seminar on ICT Policy Reform & Rural Communication Infrastructure

14-6 How to reduce the cost for the communications in rural areas?

Choice of low-cost technologies suitable for the target rural and remote area is vital factor to make the project cost as reasonable as possible. In addition, the following measures should be considered:

- Shared use of the concept and equipment, such as connecting telecenters, schools, and post offices rather than connecting individual households is the fastest way to connect the rural and remote areas of developing countries;
- In-kind contribution from stakeholders, such as recipient country, local government, local community for the installation, housing of equipments, transportation, will help to reduce the cost of projects; and
- Subsidy of start-up cost by aid funds: Funding the projects by aid agencies for the start-up of the communications system is recommended. Collaboration with the telecom operator for the operation and maintenance of the system should also be investigated.

Reference:

Kawasumi, Yoshihiko (2004), “Optimal Technologies to Connect Rural Communities” Presentation for the International Seminar on ICT Policy Reform & Rural Communication Infrastructure

14-7 What applications are needed in rural areas?

Applications of high demand by the developing countries are shown above based on the result of global survey conducted by the ITU-D SG2 Rapporteur's Group during 2003.

E-health, E-education, E-administration are high demand

According to ITU-D global survey, (Doc 111/SG2) on need of rural people's in relation to E-Services E-health (12%), E-education (12%), E-administration (information services)(10%), E-business (3%) and E-banking (3%) are high demand. ICT training (5%) is requested by rural people in developing countries.

Reference:

Kawasumi, Yoshihiko (2004), "Optimal Technologies to Connect Rural Communities" Presentation for the International Seminar on ICT Policy Reform & Rural Communication Infrastructure

14-8 What are the barriers for communications in the environment of rural areas?

There are so many barriers presented by the 55 developing countries which responded to the global survey of ITU-D SG2 Rapporteur's Group on Q10-1/2 on communications for rural and remote areas in 2003.

Physical Conditions

- Difficult topographical conditions (lakes, rivers, hills, mountains, or deserts, etc.);
- Severe climatic conditions that make critical demands on the equipment; and
- Scarcity and absence of reliable electricity supply, water, access roads and regular transport

Human Capacity Development Needs

- Scarcity of technical personnel, and
- Low literacy rate

Social and Economic Conditions

- Low level of economic activity mainly based on agriculture, fishing, handicrafts, etc.;
- Low per capita income;
- Underdeveloped social infrastructure (health, education, etc.); and
- Low population density

Reference:

Kawasumi, Yoshihiko (2004), "Optimal Technologies to Connect Rural Communities" Presentation for the International Seminar on ICT Policy Reform & Rural Communication Infrastructure

14-9 How to finance the rural projects?

It was identified by the Maitland Report and also by the WSIS Geneva Phase (Dec. 2003). In giving priority to the rural communications projects funding system:

- Governments, developing agencies and financial institutions are to give higher priority to investment in the telecommunication sector (Maitland Report);
- Developing countries should review their development plans to ensure that sufficient priority is given to investments in telecommunication (Maitland Report);
- All projects or development activities with economic or social components should have a telecommunication element built in (Maitland Report);
- Governments of developing countries should raise the relative priority of ICT projects in request for international cooperation and assistance on infrastructure development projects from developed countries and international financial organization (WSIS Plan of Action);
- Within the context of the UN's Global Compact and building upon the UN Millennium Declaration, build in and accelerate public-private partnerships (PPP), focusing on the use of ICT in development (WSIS Plan of Action); and
- Invite international and regional organizations to mainstream ICTs in their work programs and to assist all levels of developing countries, to be involved in the preparation and implementation of national action plans to support the fulfilment of the goals indicated in the declaration of principles and in this Plan of Action, taking into account the importance of regional initiatives (WSIS Plan of Action).

Subsidy by the Universal Service Funds

Some countries have already introduced legislation relating to Universal Service Obligation (USO) and Universal Service Fund

(USF) to subsidize the cost of rural communications projects and communications charges. Coverage of services is different from country to country, i.e. voice, sound and TV broadcasting, and Internet.

Partnership with Funding Institutions and Private Sectors

Partnership with funding institutions or interested product suppliers should also be investigated.

Reference:

Kawasumi, Yoshihiko (2004), “Optimal Technologies to Connect Rural Communities” Presentation for the International Seminar on ICT Policy Reform & Rural Communication Infrastructure

14-10 What are the general concerns when rural communications projects are implemented?

The following are major concerns when rural communications projects are implemented:

Regulatory Issues

- Universal Service Obligations for licensees;
- Incentives to operators and investors to extend and deploy services to rural areas;

- Cost-effective and affordable technologies for basic telecom infrastructure;
- Reaching geographically remote areas (isolated due to distance, terrain, poor transportation networks, etc.); and
- Ensuring basic infrastructure such as regular electricity

Social Issues

- Facilitation of services for low-income populations;
- Ensuring maintenance and security against vandalism and theft of cables and solar panels in rural areas;
- Education, training and improvement of awareness of modern telecommunication and ICTs for community leaders and users; and
- Services impacting positively on development (employment, health, education, improved government services, etc.) including those particularly serving illiterates, women, and other disadvantaged groups

Reference:

Kawasumi, Yoshihiko (2004), “Optimal Technologies to Connect Rural Communities” Presentation for the International Seminar on ICT Policy Reform & Rural Communication Infrastructure

Chapter 15 Wireless Technologies

Wireless Local Loop (WLL) is the technologies to cost-effectively connect last miles of sparsely populated rural areas. Particularly use of WiFi proves to be a promising way, as its reach has been extended and equipment cost becomes low. What is the prospect of WLLs?

Curriculum Topics:

- 15-1 What types of wireless technologies are used to connect rural community to telecoms network?
- 15-2 How do the wireless technologies revolutionize the connectivity in developing countries?
- 15-3 How WiFi technology can change the rural connectivity?
- 15-4 How does WiFi technology change the rural connectivity?
- 15-5 Are there wireless technologies for rural connectivity other than WiFi?
- 15-6 What is corDECT technology?
- 15-7 How can public policy unleash the power of wireless technologies?

15-1 What types of wireless technologies are used to connect rural community to telecoms network?

A revolution in community and rural access is being driven, in particular, by low-cost wireless technologies transmitting on license-exempt radio spectrum (see Question 15-3). These technologies are particularly suitable for rural and last-mile connectivity especially when the existing copper plant is weak or not in place.

Hypothetical Wireless Networks

In order to understand current wireless technologies, it is necessary to first appreciate some of the basic concepts. Consider a hypothetical wireless network installation, as depicted in Figure 1. This schematic drawing shows two radio towers (A and B), houses and other buildings (C), and a personal computer inside a building (D).

Radio tower A is connected through a wireline link to an Internet Point-of-Presence (POP) owned by an Internet Service Provider (ISP). So the PC shown at point D ultimately is connected to the Internet by several wireless links.

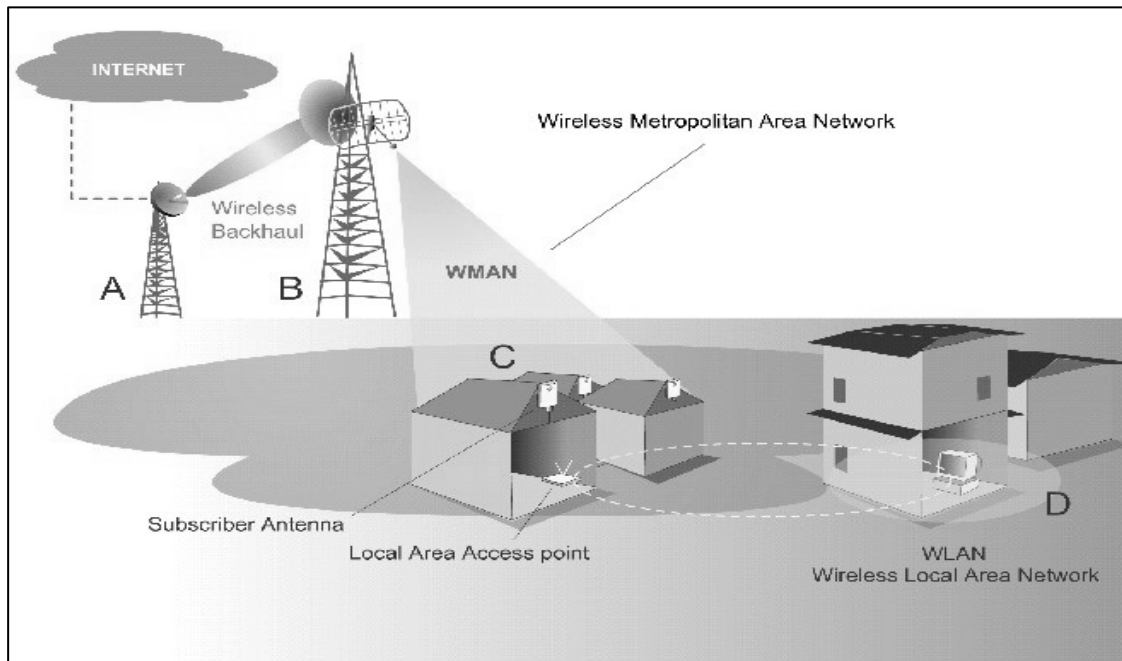
Point-to-Point Radio Connection

Each of these wireless links illustrates important differences in the way radio technologies can be deployed. The link from radio tower A to tower B is a point-to-point connection, because it supports just a single radio and antenna on either side of the link. A point-to-point radio connection is a bit like a spotlight; it is a highly focused beam of radiation.

Point-to-Multipoint Connection

On radio tower B, below the point-to-point connection to tower A, is a set of radios and antennas that establish a point-to-multipoint connection. Tower B serves as a single point on a link, but it emits a broad sweep of radiation that covers an entire area around it, including all of the buildings marked C. A point-to-multipoint connection will use one or more broad coverage antennas at the hub side (at tower B) and very focused antennas at the multiple subscriber points (buildings marked C). A point-to-multipoint connection, then, is a bit like a theatrical light with a broad beam emitting from the hub.

Figure 15-1 Wireless Network Installation



WLAN, WMAN and Wireless Backhaul

With this simple illustration in mind, it is possible to apply some of today’s common wireless terms. The access point inside the building is providing what is called a Wireless Local Area Network (WLAN) connection.

The point-to-multipoint connection from tower B to the buildings marked C is often referred to as a Wireless Metropolitan Area Network (WMAN) connection, which necessarily covers more area than a WLAN.

And the point-to-point connection from towers B to A can be called a wireless backhaul. As one moves from WLANs to WMANs and then to backhaul systems, the use of more intensely focused microwave radiation allows transmission over greater distances. It can also diminish the chances of interference and reduce the necessary power emitted. Further down the network, toward the less-focused end, WLANs and point-to-multipoint WMAN deployments allow multiple subscribers to share the same hub. They also support greater flexibility and mobility and can be easier to install.

Reference:

Best, Michael L. (2004), “Community Access to Communications: Ten Questions and Provisional Answers” White Paper for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

15-2 How do the wireless technologies revolutionize the connectivity in developing countries?

Wireless technologies are not only revolutionizing communication in the developed world; they also offer developing countries with opportunity to "leap-frog" over wire line infrastructures to the forefront of communications. However, since there are many different wireless technologies, it is important to choose the technology that best matches the needs of these new markets. While certain technologies have been very successful in urban areas, the rural ICT market has its own set of unique requirements, including: low-cost, low power, scalable, robustness, and ease of use.

Radio Links

Radio communication devices, generally operating in the SW/HF/VHF (1-100MHz) bands, have been very popular in rural

regions due to its ease of using low-cost, and robust technology. While radio remains the most practical and affordable means of broadcasting and distributing information, the use of radio for two-way communication of digital data has been very limited due to relatively low bandwidth and lack of standard hardware. In addition, the design of small, efficient, and long-distance antennas at these frequencies is not currently feasible.

Cellular Phone/Wireless Local Loop (WILL)

Given the great success of cellular phone technology in urban areas around the world, it has been interesting to consider the use of this technology in rural areas as well. While the cost of portable communication devices decreased significantly in the past decade, the cost of the wireless infrastructure requires a high population density and user base to offset its cost.

Satellite/VSAT plus Wireless

The use of satellite-based services has traditionally been the only alternative in regions where no ICT infrastructure exists. Over the past 20 years, the increasing use of higher satellite frequencies has enabled the use of smaller parabolic antennas and more compact hardware. While satellite-based connectivity is now becoming more affordable, the hardware cost and service fees are still considerable. In order to justify the cost of satellite connectivity, a satellite ground station must generally be combined with other wireless network technologies in order to distribute the available bandwidth and services to a larger user base.

WiFi WAN/LAN

Wireless data networks (Wide Area Networks and Local Area Networks) based on the IEEE 802.11 or "WiFi" standard are perhaps the most promising wireless technology. Given its popularity in developed nations, it is reasonable to consider the use of WiFi in developing countries as well. The forces driving the standardization and proliferation of WiFi in the developed world could also stimulate the communications market in the developing world. These features include: its ease of set-up and use, and most importantly, its relatively low-cost for both users and providers.

Reference:

Pentland, Alex (Sandy), Richard Fletcher, Amir A. Hasson (2002), "A Road to Universal Broadband Connectivity" MIT Media Laboratory, Cambridge, MA.
<http://cba.media.mit.edu/publications/articles/02.00.pentland.pap.pdf>

15-3 How WiFi technology can change the rural connectivity?

One technology that is capturing the attention of industry and consumers is called Wireless Fidelity or WiFi. WiFi describes a constellation of wireless technologies that comply with technical standards defined by the Institute of Electrical and Electronics Engineers (IEEE) under the nomenclature of 802.11b. Note that sometimes the term WiFi also is used to refer to other technologies employing different but related standards, such as 802.11a.

WiFi Technologies Suited for WLAN Connectivity

WiFi technologies are particularly well suited to providing WLAN connectivity that enables broadband Internet access like that illustrated between points C and D in Figure 1. Recent attention has particularly focused on the deployment of WiFi Hotspots in places like airports, fast food restaurants, and coffee shops. A hotspot is like any other private WLAN deployment, technically, but it is made available to the public often with a fee for use.

WiFi also serve WMAN and Backhaul

While the concept of a wireless hotspot inside a fast food restaurant is unlikely to conjure images of enhanced universal access, WiFi and related terrestrial wireless technologies have actually been used to build network infrastructure, such as the point-to-point and point-to-multipoint links discussed above. While 802.11b, in particular, was engineered specifically for use in a WLAN context, it has provided WMAN and backhaul service in some deployments.

Merits of Wireless Technologies for Universal Access

There are three important elements of new terrestrial radio equipment that are central to

its role in providing profitable universal access:

- (i) Decreasing cost,
- (ii) Increasing capability of the technology, and
- (iii) Utilization of license-exempt radio bands.

Coverage distances continue to increase and prices continue to drop with WiFi and related radio technologies. WLAN indoor access points can currently provide blanket coverage over a 100-meter radius for less than US\$75. Newer access points provide coverage over 300 meters. The wireless network interface cards that connect to a subscriber's personal computer can now be purchased for less than US\$50.

WiFi reaches more than 100 km point-to-point connection

Outdoor routers employing 802.11b, which today still cost more than US\$1,000, can provide point-to-multipoint or point-to-point coverage up to 20 kilometers, although generally at reduced data rates. Through a technique known as Multi-Hopping or Mesh Networks, in which multiple repeater radios are strung together, transmission networks of up to 100 km have been achieved. Outdoor 802.11b routers, providing hotspot coverage, have been demonstrated with up to a 1-km radius using high-power radios. And one WiFi equipment maker has claimed the world record of a 310 km, point-to-point link using 802.11b. This result, however, came from a stand-alone demonstration environment, with high-power radios and high-gain antennas. It seems unlikely that high data rates at these distances can be realized in the field, given standard maximum power regulations, the realities of potential interference, and the inability to extend past the visible horizon.

Reference:

Best, Michael L. (2004), "Community Access to Communications: Ten Questions and Provisional Answers" White Paper for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

15-4 How does WiFi technology change the rural connectivity?

WiFi technology opens up new possibilities for rural connectivity in developing countries.

WiFi can connect up to 20 km

Standard WiFi connectivity (IEEE 802.11b) provides up to 11 Mb/sec data rates, and operates in a band near 2.4GHz that is generally unlicensed in Europe and the Americas. Newer versions of WiFi provide 22Mb/sec in this band, and versions that operate at higher frequencies provide up to 54Mb/sec. Tests in rural setting show that a standard WiFi card (such as commonly used with laptop PCs) can provide good connectivity up to a 0.5 km radius given line-of-sight. With addition of antennas and repeaters, it is possible to achieve point-to-point connectivity at distance of up to 20 km. WiFi access points (device commonly used to provide a WiFi network) currently retail for US\$120, and WiFi cards retail for under US\$60.

WiFi may provide universal broadband connection

However, the successful implementation of this technology and the choice of usage model should be guided by an intimate knowledge of rural communities and their information and communications related needs. Our vision is that, provided a conducive regulatory environment, local entrepreneurs within developing countries could leverage WiFi-based technology to:

- (i) Solve the chicken-and-egg problem of the simultaneous need for both a market and an infrastructure (demand and supply); and
- (ii) Create a widespread wireless infrastructure that grows seamlessly scaling up to universal broadband connectivity.

Reference:

Pentland, Alex (Sandy), Richard Fletcher, Amir A. Hasson (2002), "A Road to Universal Broadband Connectivity" MIT Media Laboratory, Cambridge, MA. <http://cba.media.mit.edu/publications/articles/02.00.pentland.pap.pdf>

15-5 Are there wireless technologies for rural connectivity other than WiFi?

Other technologies are also emerging that increase the capability and lower the price of wireless networks.

IEEE 802.16 standard provides higher bandwidth for longer range

The 802.16 standard, which is also a protocol being defined by the IEEE, attempts to deliver higher bandwidth and relatively long range for point-to-point and point-to-multipoint backbone networks. Unlike 802.11b, this is not a standard for WLANs. But it can provide high bandwidth for backbone networks, with bandwidth of up to 70 megabits per second (mbps) compared to 11 mbps for 802.11b. And transmissions can currently cover up to 50 km in a single hop.

Canopy System serves longer range point-to-multipoints with broadband

Meanwhile, a proprietary system, called the Canopy System, has been developed for point-to-point and point-to-multipoint networks. With a Canopy installation, access points can reach fixed wireless subscribers at distances of up to 15 km, and the backhaul equipment can transmit over distances of up to 55 km. Signaling rates are 10 mbps, which in a point-to-multipoint system would be shared by all subscribers.

Reference:

Best, Michael L. (2004), "Community Access to Communications: Ten Questions and Provisional Answers" White Paper for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

15-6 What is corDECT technology?

Finally, attention is focusing, particularly within the developing world, on the corDECT system invented at the Indian Institute of Technology, Madras.

CorDECT serves 10-40 km point-to-multipoints broadband connection

The corDECT system is engineered specifically for cost-effective universal access. The distance possible between a subscriber unit and a point-to-multipoint base station (similar to an access point) is rated at 10 km. Relay base stations can be

used to extend this distance a further 10 km. These distances may be conservative, because with favorable line-of-site and terrain factors, 40 km has been achieved in the field. Transmission rates are currently 35-70 kilobits per second, with dedicated capacity fully delivered for each subscriber. The system can support simultaneous data and voice transmission.

Cost of corDECT drops to US\$ 300 per subscriber

Here is the punch line: initial trials have demonstrated that networks for voice and high-bandwidth data can be deployed over hundreds of kilometers, at costs currently under US\$ 50,000. Put another way, at per-subscriber costs approaching US\$ 300 (and continuing to drop), communities in relatively rural and dispersed areas can receive voice and data connectivity. Compare this to standard fiber and copper technologies deployed in many urban areas. There, network backbone costs can range from US\$ 20,000 to US\$ 40,000 per kilometer and, as a rule-of-thumb, per-subscriber costs hover at about US\$ 1,000.

Reference:

Best, Michael L. (2004), "Community Access to Communications: Ten Questions and Provisional Answers" White Paper for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

15-7 How can public policy unleash the power of wireless technologies?

To truly unleash the power of wireless technologies, like those described under 15-2, requires a range of supportive public policies. One basket of such policies we have referred to as a Rural Service Provider (RSP) license (Best, Jhunjhunwala, & Maclay, 2001).

What is Rural Service Provider licence?

This RSP license is envisioned to:

- Work only in rural or under-served areas;
- Allow barrier-free entry for small operators;

- Insist on fair interconnection with larger basic service operators and fair revenue sharing terms;
- Rationalize and reduce various duties and taxes on ICT goods; and
- Provide for license-exempt transmission on particular spectrum bands.

African Example: License-Free Bands

It is this last point that we wish to focus on and provide an example from Africa. New radio technologies and public policies have, within many countries, allowed transmission on specific frequencies by individuals without a license. These license-exempt, or unlicensed bands, include 2.4 GHz and 5 GHz in the United States and much of Europe. While these bands were initially unlicensed primarily for use by simple consumer electronics (radio controlled cars, microwave ovens, and the like) increasingly they are being used by systems providing basic Internet and telecommunication services (WiFi, WiMax, and the like).

Different Regulations for 2.4 and 5 GHz Bands

In order to assess the opportunities for license-exempt transmission in Africa, we have surveyed every country on the continent regarding their regulation and use of the 2.4 and 5 GHz bands. Responses from differing country informants, though mostly from the regulators themselves, were received from 47 of the 54 countries of Africa, accounting for 95% of the continent’s population.

There are six categories of wireless licenses that we believe are progressively more restrictive, and have been used to categorize the licensing regimes in place. The figure below shows the licensing regimes in place in the different African countries for the 2.4GHz band (specifically, 2.4-2.4835GHz). This figure illustrates the significant diversity that exists across the African continent.

Only three countries allow usage with no licensing no registration

It can be seen that in the 2.4GHz band 19% of the countries allow unlicensed use, but require a registration (15% for the 5GHz

band). Exceptions for the 2.4GHz band are Rwanda, Lesotho and Tunisia. It is significant that unlicensed bands, as are normally thought of in the United States (i.e., no license or registration required), only exist in Africa in these three countries (6% of Africa) for the 2.4 GHz Band, and 2 countries (4%) for the 5GHz Band. These are extremely low values. As for licensed use, license attribution is mostly automatic on payment of a fee (~40% of total countries).

Significant Diversity in Regulation

The responses show that there is significant diversity in the regulation of this band across Africa. Not only do licensing requirements and conditions change widely from country to country, but so do power, range and service restrictions as well as equipment certification requirements. Indeed, we find that as the burden of licensing for transmission on these bands is relaxed, there is often an increase in restrictions on power, range, or type of service. Furthermore, we find that regulation is still not in place in some countries and is changing in others, while enforcement is often low in countries where regulations do exist.

This diversity in regulations notwithstanding, these bands are indeed being utilized for wireless internet services in most African countries, often providing hotspot style coverage in urban areas, but also in some settings providing infrastructure coverage over larger areas. A significant 37% of the countries that responded are using wireless technologies operating in these bands for backhaul network connectivity in rural areas.

Reference:
 Best, Michael L. (2004), “Community Access to Communications: Ten Questions and Provisional Answers” White Paper for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Chapter 16 Cellular Phone

Cellular technologies have an advantage of covering a wide area with relatively small fixed cost. There are different standards in cellular technologies. Which is the best technology in the rural communications?

Curriculum Topics:

- 16-1 How do Cellular Phones impact the rural telecommunication?
- 16-2 Why is Mobile suitable for Universal Access?
- 16-3 Why is GSM suitable for rural communication?
- 16-4 How should business model of the GSM operators be adapted to the conditions in rural areas in developing countries?
- 16-5 Is the GSM business model viable under the rural situation in Tanzania?
- 16-6 What are the preconditions for the effective GSM rural operation?

16-1 How do Cellular Phones impact the rural telecommunication?

Mobile communications is extending the limits of the marketplace and reaching out into areas unserved by the fixed network, often at lower cost. Some Universal Access Funds (UAFs) will find that they can target some areas with lower subsidies and lower risks. The mobile explosion will also mean that some funds can focus almost exclusively on the most remote geographical localities.

Mobile operators will cover remote areas cost-effectively

The case of Uganda described in Chapter 13, illustrates this. The vast majority of the country will soon be covered by mobile and fixed-wireless service for basic access. In mid 2002 there were only 154 sub-counties out of 926 uncovered; the Rural Communications Development Fund (RCDF) is focusing on supporting access to these sub-counties. However, many of these sub-counties are already covered and thus it is expected that mobile operators will be able to serve many of these areas with minimal or zero RCDF support by the time the tender is issued in early 2004, leaving well less than 100 remote high-cost communities requiring subsidy. This will be an increasing trend in developing

countries with medium to high population densities.

Small Grants for Local Entrepreneurs

The active presence of mobile operators in rural areas could also offer development funds new opportunities to deepen their role through micro subsidies. For example, Uganda's RCDF also supports small grants or micro-credits to enable entrepreneurs wishing to set up public payphones in areas with weak wireless signals or with no power source to acquire special rural packages.

Reference:

Dymond, Andrew & Sonja Oestmann (2003), "Rural Telecommunications Development in a Liberalizing Environment: An update on universal access funds" December 2003 http://info.worldbank.org/ict/WSIS/docs/comp_RuralTelecom.pdf

16-2 Why is Mobile suitable for Universal Access?

Mobile wireless is now meeting more geographical and customer needs in Latin America, Africa, Russia, etc. Mobile technology and price packaging also has certain features which are attractive to poorer people.

Mobile wireless provides lowest-cost solution in many areas. Ability to serve private demand in addition to public access reduces the cost of universal access and subsidy required. It can provide certain universal service features:

- Pre-pay reaches poorer people
- No contracts or commitments
- Choice of package
- Soft disconnection
- Call back & in-contact features
- Messaging
- The start of email/Internet familiarity

Mobile wireless also reaches beyond into rural areas in the following way:

- Normal range for good mobile coverage 10–15 km from base stations;
- Enhanced range with line of sight, antenna and/or fixed terminal may be up to 35 km in most directions; and
- Use of existing transmission backbones, additional microwave hops or satellite to reach new base stations to serve new rural areas.

The rural mobile has potential in the countries where mobile networks are achieving massive universal access or rural progress. Those countries include:

- Bangladesh
- India
- Thailand
- Uganda
- Nigeria
- South Africa

It also has potential that base station or customer range extension can reach customers up to 35 km or 70 km distant.

Reference:

Dymond, Andrew (2004b), “Universal Access Funding Experience in Developing Countries” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

16-3 Why is GSM suitable for rural communication?

The economics of GSM technology for rural areas is based on a number of favourable conditions as compared to traditional fixed line technology.

All people are covered in the signal range

The first condition is that the area covered by the signal range of the radio systems determines the size of the addressable market. All people living in the area can become customers if and whenever they wish.

No additional cost to add a new customer

The second condition is the fact that the operator will incur virtually no expense for adding a new customer regardless of the intensity of use by this new user. With deployment of prepaid systems, even customers spending a few US\$ per month will contribute to profits.

GSM components are cheap due to the wide usage

Finally, by being the most deployed mobile technology in the world, GSM components are very price-competitive as well as becoming increasingly adapted to conditions in rural environments. A complete GSM network costs today less than the outside plant component alone in a fixed line network. GSM handsets are also much cheaper than for alternative mobile technologies.

GSM is rapidly expanding in Africa

GSM networks are already in operation in all African countries and are adding new subscribers faster than on any other continent with an average annual growth rate of 62 % over the 1998-2003 period.

Reference:

Engvall, Anders and Olof Hesselmark. (2004), *Profitable Universal Access Providers*. Report for Sida. October 2004
<http://www.eldis.org/fulltext/profitable.pdf>

16-4 How should business model of the GSM operators be adapted to the conditions in rural areas in developing countries?

Even though studies have shown that mobile services are more affordable than fixed-line services, the business model of the mobile operators is not well suited for serving rural areas. The mobile operators have become extremely profitable by focusing upon investments with short pay-back periods and upon serving the urban population. Barriers of entry are relatively low for the users (essentially the cost of the handset), but call charges are generally very high in relation to

average income levels of the population. This study has explored the viability of establishing small rural operators, which would operate under a completely new business model adapted for better serving rural, low-income areas. A key concern was to explore whether the GSM technology would be scaleable downwards with maintained cost effectiveness. The main components of this new business model are:

(1) Limited Mobility Services

Only "limited mobility" services would be offered in order to avoid infringements on existing GSM licenses and to justify different tariff policies. However, visiting customers from the national mobile operators would be allowed roaming, thus providing coverage at no investment costs for these operators;

(2) Low local tariffs would be charged

Low local tariffs would be charged comparable to those offered by the regulated fixed-line operators. This approach aims at offering services that are affordable to the rural population, resulting in a reasonably high telephone penetration;

(3) Large Incoming Traffic Revenues

A large percentage of total revenues would be generated by incoming traffic from high-income areas through existing interconnection rates; and the rural operators would own and operate a complete, independent GSM network. This is desirable in view of the absence, or high costs, of transmission facilities in rural areas and requires local switching.

Technologies

- Efficient BTS Design (radio technology) for Rural Areas
- Local Switching to Save on Transmission Costs
- Prepaid System with Cost Notification

Marketing

- Low Barriers of Entry with Cheap Local Calls
- Limited Mobility Services
- Cheap Handsets with Micro Credit Financing

Reference:

Engvall, Anders and Olof Hesselmark. (2004), *Profitable Universal Access Providers*. Report for Sida. October 2004
<http://www.eldis.org/fulltext/profitable.pdf>

16-5 Is the GSM business model viable under the rural situation in Tanzania?

In order to make the assessment in the study as realistic as possible, Tanzania was chosen as target country.

Teledensity in the covered area is 12.5%

According to one of the operators, the mobile networks now cover 7% to 9% of the country's area and 25 % of the population --- about 8 million --- are covered. Tanzania has today more than one million mobile phone users, which in the covered areas corresponds to a penetration of about one in eight or a teledensity of 12.5 %.

Three sample areas were chosen to simulate the profitability

Three model areas in Tanzania were selected for reference purposes. They all have limited fixed-line service, no mobile coverage and are typical rural communities with limited access to public power supply. These areas were briefly described with demographic information and forecast telephone usage, for the purpose of inviting suppliers to provide network solutions with budgetary prices.

The suppliers took great interest in the study, as witnessed by an average number of bids of 3.4 per network component. The majority of the bidders had previous experience of working under conditions similar to our model areas. Meetings were held with seven of the suppliers.

With lower tariff, teledensity is expected to be 6%

By studying income distribution data for Tanzania, using the gini-curve and ITU statistics on percentage of income spent on telephone services, the study concluded that a teledensity of 6 % could be expected. This would be achieved by offering the services at tariffs that take into account the rural population's low ability to pay. The report gives recommendations on how to keep the barriers of entry low by providing cheap

handsets with micro financing. Our analysis showed that we would get lower revenue --- but higher usage per subscriber --- compared to existing mobile operators with an average ARPU of US\$ 14-18 per month.

GSM is the most cost-effective technology

The study confirmed that GSM would be the most cost effective technology for providing rural, low-income areas with telephone services. It showed that independent operators with target network sizes from 20,000 subscribers would be profitable.

The investigation pointed at investment costs for equipment corresponding to US\$250 to 300 per subscriber and US\$55,000 to 70,000 per TRX using local switching. These figures are in-service figures and do not include the costs for establishing the operator, including a central building location with AC power. These investment costs are considerably higher than for nationwide rollouts, but are due to expensive transmission services and power supply as well as the additional costs for local switching.

Reference:

Engvall, Anders and Olof Hesselmark. (2004), *Profitable Universal Access Providers*. Report for Sida. October 2004
<http://www.eldis.org/fulltext/profitable.pdf>

16-6 What are the preconditions for the effective GSM rural operation?

The study highlighted a number of preconditions for the scenario to be effective, including:

- Exclusive use of prepaid systems for service charging;
- Local switching for the served area;
- Licensing issues would need special attention;
- Access to interconnection points in the national network; and
- Allocation of GSM frequency channels.

GSM Model profitable without subsidies, but not in line with expectation of investors

The study showed that this type of rural mobile operators can be profitable without subsidies, but it is also clear that the level of profitability is not in line with the expectations of investors in national GSM operators. In most developing countries, the mobile operators continue to show spectacular financial results. The target group in this study is, however, the rural populations in poor African countries. There will be disadvantages of scale for our small operators; this will discourage commercial investors and probably not look attractive to existing operators. The rural operators will bring the first ICT services to rural populations, creating obvious economic and social values in the society. It is for this purpose that most countries have set up Universal Service Fund arrangements, and we believe our concept would fit very well in this context. Criteria for Universal Service Providers can be set up in order to lower the financing costs for the operators, giving access to USF funds and/or cheaper finances through international organisations.

The conclusion of this investigation is that rural GSM operators would be profitable.

Profitable Universal Service Providers

by Anders Engvall and Olof Hesselmark, June 2004.

Summary of a report to Sida.

The Swedish International Development Agency (Sida) has commissioned this feasibility study aimed at studying the viability of providing rural, low income, areas in developing countries with communications services. The study has explored innovative use of GSM technology and evaluated the financial viability of self-sustained Micro Telephone Operators serving rural areas.



These telephone booths in Namibia were an appropriate answer to access when only fixed technology was available. With full GSM coverage in the area they are only of marginal importance.

The economics of GSM technology for rural areas is based on a number of favourable conditions as compared to traditional fixed line technology:

- The first condition is that the area covered by the signal range of the radio systems determines the size of the addressable market – all people living in the area can become customers if and whenever they wish;
- The second condition is the fact that the operator will incur virtually no expense for adding a new customer regardless of the intensity of use by this new user. With deployment of prepaid systems, even customers spending a few USD per month will contribute to profits; and
- Finally, by being the most deployed mobile technology in the world, GSM components are very price competitive as well as becoming increasingly adapted to conditions in rural environments. A complete GSM network costs today less than the outside plant component alone in a fixed line network. GSM handsets are also much cheaper than for alternative mobile technologies.

GSM networks are already in operation in all African countries and are adding new subscribers faster than on any other continent with an average annual growth rate of 62 % over the 1998-2003 period. Even though studies have shown that mobile services are more affordable than fixed line services, the business model of the mobile operators is not well suited for serving rural areas. The mobile operators have become extremely profitable by focusing upon investments with short pay-

back periods and upon serving the urban population. Barriers of entry are relatively low for the users (essentially the cost of the handset), but call charges are generally very high in relation to average income levels of the population.

This study has explored the viability of establishing small rural operators, which would operate under a completely new business model adapted for better serving rural, low-income areas. A key concern was to explore whether the GSM technology would be scaleable downwards with maintained

a reasonably high telephone penetration;

- A large percentage of total revenues would be generated by incoming traffic from high-income areas through existing interconnection rates; and the rural operators would own and operate a complete, independent GSM network. This is desirable in view of the absence, or high costs, of transmission facilities in rural areas and requires local switching.

In order to make the assessment in the study as realistic as possible, Tanzania was chosen as target country. According to one of the operators, the mobile networks now cover 7 to 9 percent of the country's area and 25 % of the population – about 8 million – are covered. Tanzania has today

more than one million mobile phone users, which *in the covered areas* corresponds to a penetration of about one in eight or a teledensity of 12.5 %.

Three model areas in Tanzania were selected for reference purposes. They all have limited fixed line service, no mobile coverage and are typical rural communities with limited access to public power supply. These areas were briefly described with demographic information and forecast telephone usage, for the purpose of inviting suppliers to provide network solutions with budgetary prices.

Business Model for Universal Service Providers

- **Technology**
 - Efficient BTS Design (radio technology) for Rural Areas
 - Local Switching to Save on Transmission Costs
 - Prepaid System with Cost Notification
- **Marketing**
 - Low Barriers of Entry with Cheap Local Calls
 - Limited Mobility Services
 - Cheap Handsets with Micro Credit Financing
- **Licensing**
 - Access to Interconnection Points
 - Allocation of Adequate Number of GSM Channels
 - Flexible Licensing Process

cost effectiveness. The main components of this new business model are:

- Only “limited mobility” services would be offered in order to avoid infringements on existing GSM licenses and to justify different tariff policies. However, visiting customers from the national mobile operators would be allowed roaming, thus providing coverage at no investment costs for these operators;
- Low local tariffs would be charged comparable to those offered by the regulated fixed line operators. This approach aims at offering services that are affordable to the rural population, resulting in

The suppliers took great interest in the study, as witnessed by an average number of bids of 3.4 per network component. The majority of the bidders had previous experience of working under conditions similar to our model areas. Meetings were held with seven of the suppliers.

By studying income distribution data for Tanzania, using the gini curve and ITU statistics on percentage of income spent on telephone services, the study concluded that a teledensity of 6 % could be expected. This would be achieved by offering the services at tariffs that take into account the rural population's low ability to pay. The report gives recommendations on how to keep the barriers of entry low by providing cheap handsets with micro credit financing. Our analysis showed that we would get lower revenue - but higher usage per subscriber - compared to existing mobile operators with an average ARPU of US\$ 14-18 per month.

The study confirmed that GSM would be the most cost effective technology for providing rural, low-income areas with telephone services. It showed that independent operators with target network sizes from 20 000 subscribers would be profitable.

The investigation pointed at investment costs for equipment corresponding to US\$ 250 – 300 per subscriber and US\$ 55 – 70 000 per TRX using local switching. These figures are in-service figures and do not include the costs for establishing the operator, including a central building location with AC power. These investment costs are considerably higher than for nationwide rollouts, but are due to expensive transmission services and power supply as well as the additional costs for local switching.

The study highlighted a number of preconditions for the scenario to be effective, including exclusive use of pre-paid systems for service charging and local switching for the served area. Licensing issues would need special attention, like the access to interconnection points in the national network and the allocation of GSM frequency channels.

The study showed that this type of rural mobile operators can be profitable without subsidies, but it is also clear that the level of profitability is not in line with the expectations of investors in national GSM operators. In most developing countries, the mobile operators continue to show spectacular financial results. The target group in this study is, however, the rural populations in poor African countries. There will be disadvantages of scale for our small operators; this will discourage commercial investors and probably not look attractive to existing operators. The rural operators will bring the first ICT services to rural populations, creating obvious economic and social values in the society. It is for this purpose that most countries have set up Universal Service Fund arrangements, and we believe our concept would fit very well in this context. Criteria for *Universal Service Providers* can be set up in order to lower the financing costs for the operators, giving access to USF funds and/or cheaper finances through international organisations.

The conclusion of this investigation is that rural GSM operators would be profitable.

Part V Telecenters

Telecenters	
Question 14. Telecenter Development	
What is the government policy to promote community telecenters?	
Level 1.	There is no government policy to promote community telecenters. There is no telecenter pilot project to learn lessons from.
Level 2.	There are several telecenter pilot projects, but there is no systematic evaluation of these projects. The government has no systematic telecenter development policies.
Level 3.	The government has developed a telecenter promotion strategies and policies. There are several telecenters created under these strategies.
Level 4.	The government has a strategy to scale up the telecenter project using private entrepreneurs, civic organizations and NGOs to manage the centers in a financially sustainable manner.
Level 5.	The government has a comprehensive plan to develop telecenters, with a capacity building program for telecenter managers, and a financial plan to support telecenter founders, such as utilizing universal access fund, and community participation. The government is promoting the telecenters through promotion of social and economic utilization of ICTs in rural areas.
Question 15. Community Participation	
What is the government policy to promote community participation in promoting rural connectivity?	
Level 1.	There is little community participation in developing the rural connectivity programs.
Level 2.	The government has consulted the village leaders, NGOs and civil society in the plan to promote rural connectivity.
Level 3.	The government has formulated a strategy to improve rural communications with systematic involvement of the community groups and NGOs.
Level 4.	The government has conducted a participatory demand survey for the community needs for rural connectivity including the poor and vulnerable groups in the rural community, to identify demand for e-learning, e-commerce, distance health services or e-government.
Level 5.	The government has created a comprehensive strategy and action plan to build capacity of community groups to create telecenters and other communication infrastructure based on a participatory approach to identify demand and create a mechanism for the community to support the telecenter management.

Chapter 17 Business Models for Telecenters

Basic services of telecenters are telephone, email and Internet access. Based on such connectivity, telecenters offer additional services. What kind of services does meet the local demands and how to identify demand for various services? What are the cost and revenue structure of typical telecenters?

Curriculum Topics:

- 17-1 What types of telecenters do exist?
- 17-2 Who are the key players in creating a telecenter?
- 17-3 What kinds of typologies are proposed in the literature?
- 17-4 What kind of services can multi-purpose telecenters offer?
- 17-5 How to scale up sustainable telecenter models?
- 17-6 What is the telecenters' future?

17-1 What types of telecenters do exist?

Beyond these common elements of public access and ICT services, there is great variety in the way that telecenters are funded, owned and operated, as well as in the way they serve different kinds of users, and utilize different technology to provide service. IDRC's work in Latin America, Africa and Asia has helped us to identify at least six types of telecenters experiences, or models. These models are not exclusive, since some telecenters are in fact hybrid versions of two or three different types.

Basic Telecenters

Basic Telecenters are generally located in rural or marginalized areas, where the population has limited access to services in general (communication or others), and where there are high rates of illiteracy. They tend to be small operations funded by international agencies and implemented by NGOs or other non-profit groups, with a small number of computers using dial-up connections to an Internet Service Provider (ISP) set up in a room or hut adapted for this use. In some cases, innovative Internet access solutions are being explored involving radio and wireless connectivity. Given the nature of this activity, a key ingredient for success is the training of

operators and people from local communities who are potential users. The major challenge basic telecenters face is financial sustainability once donor support ends.

Telecenters Franchise

A different approach to deployment is the establishment of a series of telecenters, which are centrally coordinated but independently owned and operated. A local organization usually facilitates the creation of individual, networked telecenters through technical and/or financial support. The local private sector or the government may fund the first stage of implementation and provides some technical support. After establishment, each individual telecenter is run like a small business, eventually becoming independent both financially and technically. They generally feature a small number of computers for public access and dial-up connections to ISPs.

Civic Telecenters

A variety of public libraries, schools, universities, community organizations, and other civic institutions are starting to offer public access to their computers and Internet connections. The primary focus for these groups is not the telecenter activity itself, since this is something that is offered in

addition to their own cultural, educational and recreational services. Many of these organizations may not regard themselves as telecenters, which makes their identification, and therefore their involvement in research or exchange programs, even more difficult.

Telecenters of this type generally offer limited services and little in the way of training for potential users, and often do not publicize their services very openly or outside the immediate community they serve. Access is also limited by the priority given to the primary activities of the host organizations. Connectivity usually depends on a single dial-up connection (e.g. public libraries or community centres), or more sophisticated local area networks (LANs) and dedicated lines (e.g. in some schools and universities).

Phone Shop

Phone shops are generally commercial operations, implemented by the private sector and run like small businesses. Services vary according to local needs. In some cases, fax and e-mail have been added to local and long distance telephone service. Interestingly, one third of Senegal's 9,000 phone shops are located in rural areas. The ones offering electronic communication services tend to adopt the cybercafe model. In India, many phone shops offer international direct dialing and automated time measurement features which facilitate billing for customers. In many Latin American neighbourhoods, people can make phone calls and receive messages economically in stores, businesses, and even private homes. However, this type of ICT activity is quite different from the African phone shop model and less relevant to this typology. The focus here is on telecenter types offering electronic communication services that go beyond basic telephone access.

Multi-Purpose Community Telecenters (MCT)

Multi-purpose Community Telecenters (MCTs) are being introduced in a number of countries as pilot projects supported by the ITU. These facilities offer more than basic ICT services, focusing on specialized applications such as tele-medicine and tele-education. They could also provide postal and banking services and function as

an outlet for other communal services such as water and electricity. A maximum offer of private information and communications services, such as tele-trading, rental of virtual offices, vocational training courses, support to SMEs, email and Internet access, will improve the sustainability and increase the impact of the MCT (Ernberg 1998a, Universal Access for Rural Development).

MCTs tend to establish Internet connections via leased lines or Integrated Services Digital Network (ISDN), with local area networks connecting a number of computers (e.g. 3-20) made available for public access. In addition, specialized equipment for applications such as video-conferencing or tele-medicine may be available.

Reference:

Gomez, Ricardo, Patrik Hunt, Emmanuelle Lamoureux (1999), "Enchanted by Telecentres: A Critical look at Universal Access to Information Technologies for International Development" Paper presented at the conference "New IT and Inequality", University of Maryland, February 1999
<http://www.idrc.ca/pan/enchanted.html>

17-2 Who are the key players in creating a telecenter?

In the creation of a local capacity to build information kiosks there are four key functions:

- (1) Effective community organization to support the kiosks;
- (2) Efficient and innovative kiosk managers;
- (3) Telecom service providers; and
- (4) Kiosk support institutions to provide technical, business and logistical support to kiosk managers.

Who provide such roles differ between models

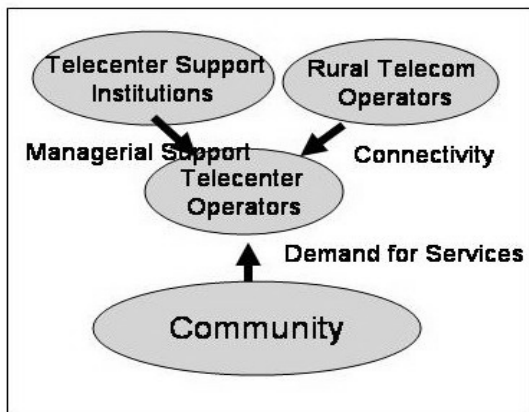
There are different models where different players supply these functions. In some models, the same players provide some of these functions (for example, community directly manages kiosks). In the typical commercial models, a kiosk manager is an independent entrepreneur who invests his capital in the kiosk and creates community organizations to guide his kiosks activities, he is supported by a franchiser who provides

technical, managerial support for the kiosk operations. Kiosk managers select one of the telecommunication service providers who provide communication access channels.

Role of the Community and NGOs

For the sustainability of information kiosks, the role of the community is essential. There should be a mechanism for the community members, including the poor and vulnerable, participate in designing the services that the kiosk provides. A village community can create an information kiosk through contribution of capital and by forming a governing body. Alternatively, a village community may create an advisory body to support a kiosk manager on identifying community demands for services and providing mutual support and partnership arrangements. Capacity of kiosk managers and community leaders to conduct jointly a participatory demand survey and stakeholders meetings including the poor and vulnerable group in the design phase is essential for the success of the kiosks. In many cases, local NGOs could conduct the role of such capacity building most effectively.

Figure 17-1
Key Players in Creating a Telecenter



Role of Local Entrepreneurs

For kiosks to be financially sustainable, the roles of entrepreneurs are crucial. According to the Canadian CIDA’s pilot telecenter project in Thailand, private sector-managed centers have shown better performances in terms of achieving financial sustainability (e.g., producing current operational profit). There are also many examples where the kiosk manager’s entrepreneurial dedication played a key success factor for kiosk

operations. However, information kiosk managers require a combination of technical, managerial and social development skills that are sometimes difficult to learn spontaneously by local entrepreneurs. There is a need for a systematic capacity building program for local entrepreneurs to be able to become effective kiosk managers. This role will be generally provided by private and public entrepreneur support organizations, such as chamber of commerce, incubators and SME support centers. But various types of “Kiosk Support Institutions” can provide more information-kiosk-specific support.

Role of Kiosk Support Institutions

In scaling up kiosk networks, the role of Kiosk Support Institutions is crucial. They provide a kiosk manager with the necessary managerial support, such as manuals for operation, establishing a legal framework for kiosk, and technical manual and support for installation and maintenance of computers and other equipment, and necessary operational software. Kiosk Support Institutions may come in a variety of forms: NGOs, private sector franchisers, public agencies, and academic institutions.

In the case of NGOs, they often have a long history of community capacity building and empowerment. They understand the importance of information in empowering the poor, women and other vulnerable groups. They sometimes have excellent capabilities for participatory community development skills. Some NGOs have already been working in using ICT to assist such vulnerable groups in urban and remote rural areas. With some more systematic capacity building on information kiosk specific knowledge, they can become an effective Kiosk Support Institution. In Sri Lanka, Sarbodaya, the largest NGO has already created several information centers as an integral part of its village empowerment program. In the e-Sri Lanka program, Sarbodaya becomes one of the major kiosk support institutions.

Role of Rural Telecom Providers

Rural Communication Providers play a crucial role of connecting telecenters to telephone and Internet network. They are the experts on the rural connectivity technologies such as wireless local loops and cellular phones. Sometimes they are also

providing the role of telecenter support institution and owner of telecenters.

However, it is necessary to consider the separation of these four functions in order to bring different skills and expertise and allow variety of innovative business models and different types of telecenters, such as school-based, community-owned, private entrepreneur-owned and civic organization-owned telecenters.

Reference:

Kusakabe, Motoo (2003), "Knowledge Sharing and Capacity Building: Scaling up Information Kiosks. Connected for Development - Information Kiosks and Sustainability," Edited by Badshah, Akhtar, et.al. United Nations ICT Taskforce, One UN Plaza New York, NY

17-3 What kind of typologies is proposed in the literature?

A number of typologies for ICT community access centers have been described in the literature. The first two conflate, without explicit mention, a number of dimensions that are enumerated in the third.

Proenz, Bastidas-Buch, & Montero (2001)

In Proenz, Bastidas-Buch, & Montero (2001) a typology for telecenters, or community access centers, is defined by:

- Commercial
- Franchise
- NGO
- University
- School
- Municipal
- Multi-purpose

Here the main dimension from which the topology is defined is location and ownership models.

Reference:

Proenz, Francisco J., Roberto Bastidas-Buch, & Guillermo Montero (2001), *Telecenters for Socioeconomic and Rural Development in Latin America and the Caribbean* Washington, D.C.: FAO, ITU, IDB.
<http://www.iadb.org/sds/itdev/telecenters/index.htm>

Gomez, Hunt, & Lamoureux (1999)

A similar typology is offered by Gomez, Hunt, & Lamoureux (1999), to wit:

- Basic
- Franchise
- Civic
- Cybercafe
- Phone Shop

Reference:

Gomez, Ricardo and Patrik Hunt eds. (1999), *Telecentre Evaluation: A Global Perspective* Paper presented at the International Meeting on Telecentre Evaluation, Quebec, Canada, Sept. 1999
<http://www.idrc.ca/pan/wrkshp2.pdf>

Hudson (1999)

A much more elaborated ontology has been described by Hudson (1999):

A. Local Context

- Location: urban, periurban, rural, remote (very isolated)
- Population: size, density, cultural groups, languages
- Economy: incomes, local economic activities, other sources
- Social factors: education levels, gender, schools in area, health problems, access to health facilities
- Other community factors: leadership structure, political groups, religious groups.

B. Telecentre Services

- Telephone only
- Telephones plus other ICTs (fax, computers, Internet)
- Other ICTs only (computers, Internet)
- Other information (newspapers, books)
- Other services (training, copying, typing, research)

C. Telecentre Organization

- Institutional model: community-based (stand alone or part of community organization), sector-based (school, library, other development sector)
- Business model: profit-making (stand alone or part of other business) cost recovery (non-profit but able to cover costs), subsidized (by public sector, by international donors, by government)

- Ownership: individual entrepreneurs, business, NGO, government

D. Policy Environment

- Government telecommunications structure and mandate (lead department or ministry, regulatory body)
- Government policies on access (universal service or access goals, special tariff policies with subsidies and incentives)
- Structure of the telecommunications sector (degree of privatization, degree of liberalization)

Reference:

Hudson, Heather (1999), "Designing Research for Telecentre Evaluation" Paper presented at the International Meeting on Telecentre Evaluation, Quebec, Canada, Sept. 1999
http://www.idrc.ca/telecentre/evaluation/nn/20_Des.html

Dimensions to Classify Telecenters

Certainly a number of clear dimensions emerge from these typologies that are of importance: Ownership and sustainability model, location and local context, technology and service range. All of these are useful in describing and categorizing systems for community access.

Different Names for Telecenters

A number of neologisms are used to describe points within these ontologies, for instance telecenters, telecottages, community technology centers, community communication shops, village knowledge centres, networked learning centers, multipurpose community telecenters, digital clubhouses, cabinas publicas, infocentros, telecentros, espaces numerises, telestugen, community access centres, etc.(Gomez, Hunt, Lamoureux, 1999). (In this report, we will generally use the term telecenters throughout this document.)

Reference:

Best, Michael L. (2004), "Community Access to Communications: Ten Questions and Provisional Answers" White Paper for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

17-4 What kind of services can Multi-purpose Telecenters offer?

"Multi-purpose" means that a Telecentre is able to provide a variety of services to different user groups within a community: for example, services relating to education and training; health; community information; e-government; e-commerce; culture and entertainment; social issues; safety and many more.

Education

Most of the telecenters offer E-Literacy training as their basic services. This gives the youth and adults in the community the necessary knowledge of how to use computers, e-mails and Internet. If people become interested in more advanced knowledge in computing, they will provide an advanced course themselves or introduce them to e-learning courses.

Telecenters may be used to provide access to distance education. Through the Internet students and educators can register with educational institutions anywhere in the world; access archival material or receive online instruction from central national services. Telecenters can also serve distance education students by providing educational software packages on site and upgrading them as new educational packages are produced.

Health

Access to health information and health care is the most important demand for telecenter services. Basic health information on maternal health, child-care and communicable diseases, such as HIV/AIDS, tuberculosis and malaria, is important for the members of the community.

For people who want to consult with a doctor in remote villages, distant medicare or e-medicine provides a great help to connect to the doctors and hospitals in cities to get a diagnosis through Internet.

Specialized services can be offered to healthcare workers, enabling them to use telediagnosics programs, order supplies, pass on public health information, and to

obtain specialist advice for complex health problems.

Community Information Service

Telecenters can provide opportunity for the community members and organizations to create websites for their activities in local language. This helps community members to acquire local information easily and attract people to familiarize with Internet. This will eventually lead to a creation of e-commerce and e-government and various types of forum sites.

Business Training and E-Commerce

Telecenters also serve for employment opportunities, training and business enterprise. Telecenters allow entrepreneurs and business people to plan and prepare their arrangements and to communicate with partners and potential clients from a distance.

Telecenters also provide e-commerce service for village people to buy on-line or sell their crafts and agricultural products through e-commerce site.

E-Government

Telecenters can be a good delivery mechanism for the e-government services. People in the remote villages can access government service information, download various forms, apply for registration/licenses or government procurement through Internet, make complaint and grievances through Internet, etc.

Reference:

Jensen, Mike and Anriette Esterhuysen (2001), *The Telecentre Cookbook for Africa: Recipes for Self-sustainability*. UNESCO <http://unesdoc.unesco.org/images/0012/001230/123004e.pdf>

17-5 How to scale up sustainable telecenter models?

There are numerous pilot projects and some commercial franchise activities to create information kiosks. Some of these pilots provide valuable lessons for operational and financial sustainability and social developmental impacts. However, comparing the number of villages and communities in need for information access,

a formidable challenge of scaling up sustainable models in developing countries is imperative. A different set of issues is to be confronted when scaling up information kiosks, say, from the creation of several pilots kiosks to thousands of kiosks.

Financial sustainability is imperative

Firstly, relying on a limited amount of donors' grant is impossible. We need to identify models basically relying on the financially sustainable and commercially viable models with clearly defined scheme of government subsidy on public services.

Local Capacity Building

Secondly, the need for resource on local capacity for designing, creating and managing kiosks rather than relying upon foreign consultants. There is a need for a large cadre of domestic entrepreneurs and supporting staff capable of responding to community demands and managing innovative business models, maintaining high tech equipment and providing services to the community in a socially and culturally sensitive manner. As described earlier the capacity to create information kiosks requires skills and knowledge on technical, managerial and social dimensions.

Reference:

Kusakabe, Motoo (2003), "Knowledge Sharing and Capacity Building: Scaling up Information Kiosks. Connected for Development - Information Kiosks and Sustainability," Edited by Badshah, Akhtar, et.al. United Nations ICT Taskforce, One UN Plaza New York, NY

Akagawa, Masatoshi (2004), "JICA's Experience in Telecentre Development: Rural Internet Centers in Malaysia" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

17-6 What is the telecenters future?

One dreams of doubling the per-capita rural income in coming years. Providing IT and communications can not be an end in itself --- it can be a mere means for such dreams.

Rural SMEs are the Wealth Creators

Going beyond education and health, kiosk has to be used to enable creation of SMEs in each village. The enterprises, in the area of agriculture and agricultural-processing, animal husbandry, rural industry and IT-based services from rural areas to urban areas, would be the wealth-creators for rural areas. IT and communications has to be used to enable these enterprises; especially the communications has to enable financing of these enterprises, knowledge, training and support to these enterprises, buying, selling and logistics for these enterprises and risk-sharing for such ventures.

Tomorrow's Kiosk

Tomorrow's kiosk will not just be for a computer and communications. It would provide a communication hub, providing connectivity to some 50 cell phones and 6 to 10 thin clients with wireless connection in each village. It would provide a virtual university and training center and technology support center. It would be a support center for entrepreneurship. It would be a bank outlet and trading outlet. It would be an agricultural support center and a medical support center. In times to come, a kiosk can grow to much more and be a major support center for all activities in rural areas

Is the Model in rural India replicable in other developing economies?

A question that arises is this experiment in Rural India replicable in other developing

countries. The answer is not straightforward. The use of business to drive communications and services would certainly be replicable, aggregating demand where incomes are low. Many of the technologies developed, could be of immense use, but would have to be tailored for specific areas. Newer technologies, designed for specific area would be required. Similarly, business model would have to be tailored.

Creating entrepreneurs is the only way to reach vast rural poor

To sum up, creating enterprises and entrepreneurs, would be the only way to reach the vast rural areas of India and the world. IT and Communications can not be an end in itself, but only a means. Significant impact to the lives of rural people can be the only goal. Doubling of per-capita rural GDP could be an end goal which can galvanise the whole system. Innovative technologies and applications would be required. They have to be locally developed, with a rural focus.

Reference:

Jhunjhunwala, Ashok (2004). "Can Internet Provide Opportunity for the 5 Billion Unconnected in Developing Economies to Leap-Frog?" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Chapter 18 Sustainability of Telecenters

To create telecenters at every village, financial and operational sustainability is the pre-requisite. So far, there are many pilots which failed to achieve such sustainability. However, there are some models that have achieved current account sustainability, namely, current revenues cover recurrent costs.

Curriculum Topics:

- 18-1 How to define sustainability?
- 18-2 How to define and measure financial sustainability of telecenters?
- 18-3 Why sustainability of telecenters so important?
- 18-4 What are the factors influencing the financial viability of telecenters?
- 18-5 How to keep the telecenter cost low?
- 18-6 What is human resource sustainability and how to measure?

18-1 How to define sustainability?

Certainly a holy-grail of any community access projects is its sustainability. By the word ‘sustainability,’ we mean at least four critical components:

- Economic sustainability
- Political / Institutional sustainability
- Social / Cultural sustainability
- Technological sustainability

Heeks (2002) has written convincingly about the high level of failures in information systems deployed in developing countries. He distinguishes between total failures, partial failures, and sustainability failures. A sustainability failure is “an initiative that at first succeeds but is then abandoned after a year or so (Heeks 2002, p.102).

Economic Sustainability

The most obvious of these forms is economic or financial sustainability. This is a critical element if the government or donor community is not planning to support the telecenter for its entire lifetime (which is generally the case).

Political/Institutional Stability

In some ways, political and institutional sustainability is more important and harder to realize than economic sustainability. Many community access projects have

political champions, and many sorts of services and activities (e-government activities, supportive public policies, rights-of-way, etc.) require political support. Thus, the difficulty is in ensuring that the political forces are supportive and assisting the project, while at the same time ensuring that the any changes in the politicians and civil servants related to the project will not be the death of the program. The same is true for other related institutions including the donor bodies, the program and implementation institutions, and so forth.

Social/Cultural Sustainability

We refer to this concept under sustainability but will consider it under the category on “equity” since, in our estimation, they are the same thing. This is because, without real attention to equity of access there can never be long-term social and cultural sustainability.

Technological Sustainability

By saying ‘technological,’ we mean at least two things. One is the standard problems of maintenance and upkeep of these complicated technologies. Since community access often implies contexts that might be remote or relatively isolated, the presence of people and facilities with the capacity to maintain computer technologies may be

weak. So part of this sustainability problem is related to the internal capacity issues outlined in the category of "Capacity Building." In order to reduce the frequency of system failures to an acceptable level there is a desire to "tropicalize" the technologies in many of these settings. The level of humidity, heat, particulated dust, and other factors may be greater in these settings than in the office setting that the systems were engineered for. One researcher is engineering computer systems with larger fans, positioned externally, and air cleaning filters that should extend the lifetime of the technologies in these communities. Other engineering affordances of value include the ability to do remote sensing of system status and some remote maintenance.

Another form of technological sustainability is the requirement that the intervention remain sustainable against the constant and rapid march of technological development including the planned obsolescence cycles found with many systems. On the one hand, these interventions need to embrace the rapid progress of technologies and understand that many systems will not have a lifetime beyond two or three years. On the other hand, it is critical to be resistant to unnecessary cycles of planned obsolescence that are thrust on us by various technology companies. Note that open source software (OSS) is more resistant to planned obsolescence since these systems can more readily evolve and be adapted to changes in the technology environment.

Reference:

Best, Michael L. (2004), "Community Access to Communications: Ten Questions and Provisional Answers" White Paper for International Seminar on ICT Policy Reform and Rural Communication Infrastructure sponsored by EBRD, JICA, IDRC and Keio University Aug.23-Sept.1

Best, Michael L., & Maclay, Colin M. (2002), "Community Internet Access in Rural Areas: Solving the Economic Sustainability Puzzle" In G. Kirkman, J. Sachs, K. Schwab & P. Corneilus Eds., *The Global Information Technology Report 2001-2002: Readiness for the Networked World*. Oxford University Press.

Heeks, Richard (2002), "Information Systems and Developing Countries: Failure, Success, and Local Improvisations" *The Information Society*, 18(2), pp.101-112.

18-2 How to define and measure financial sustainability of telecenters?

There is considerable interest in the issue of sustainability of telecenters, especially for those who receive assistance during the start-up phase in the form of reduced tariffs, special investments in equipment and infrastructure or international donor assistance. The big question is "Will the telecenter be financially viable once the special grants have ended, the equipment needs to be replaced and upgraded, and the telecenter has to compete on a commercial basis, or at least run on less public funding?"

Concern for Lack of Sustainability

A number of telecenters have been established in African communities which do not meet the minimum level of income and infrastructure which would seem to be necessary for their financial success and there is concern that these will, like other development projects before them, fail and bring with them the experience of failure for the community involved. These questions also arise for telecenters which are established by the private sector, but in these cases, there is a smaller gap between the cost of start-up and the reality of annual operating costs and revenues because they tend to be more incremental in approach (starting as a phone kiosk) and build up as demand and revenues allow.

Telecenters seen as viable if they cover operating costs

The basic indicator of financial sustainability is that the revenues of the telecenter (including grants, in-kind support, and cash earnings) are greater than the expenditures, and that this happy situation is projected to continue at least for the next three years. This accountant's view of financial viability is complicated by the fact that community telecenters are seen as a mix of public good and private service, and this mix is generally reflected in the funding structure. Many telecenters receive some public funding, at least during the start-up phase although there are many commercial

phone-fax shops and cybercafes, particularly in urban and peri-urban areas with high population densities, which operate without direct public support. The situation is further complicated by the special tariffs, grants and regulatory arrangements made to support telecenters in their initial phases, especially in areas where they are unlikely to survive on their own earnings. The financial sustainability of a telecenter is therefore dependent on a number of intersecting factors related to the telecenter's own budget, its local catchment area of users, and to the wider policy and technology environments in which it operates. In practice, telecenters may be seen as financially viable if they cover their operating costs.

Start-up cost and longer-term operational cost differs significantly

The telecenter will have significant start-up costs in building or converting a structure to house the equipment, in putting in suitable power and telecommunications supplies, and in equipping it. For a number of the pilot telecenters supported by the Acacia Initiative and its partners, these initial costs are being fully or partially met by public funding or international donor support. In some projects, the normal criteria for installing telecommunications links (in terms of population, GNP or economic activity) are being waived by the government. These subsidies mean that the telecenters get started, but they do not ensure financial sustainability in the longer-term. Several of these pilot projects may, in fact, have a harder time achieving sustainability once the subsidies and grants end. In general, the budget for the start-up phase will be different from later operational years and in some cases, may not well predict longer-term sustainability.

Significant Training and Maintenance Costs

Experience from telecenters in different parts of the world shows that the costs most commonly underestimated are: staff training; security (both physical security and data security); and the costs of updating and maintaining equipment, especially computers. There are built in uncertainties in the expenditures, especially in relation to communication costs, which are established by the telecommunications supplier and which can change suddenly with a change in

government policy. In a preliminary evaluation of the US experience in South Africa, one of the major problems was the prices charged by the telecenter operator for the services. The US does not fix tariffs or prices and found that the pricing structure varied between telecenters and could be well below or well above actual costs. This clearly jeopardizes financial sustainability, both directly and in terms of future user satisfaction.

Revenue from Ancillary Business

On the revenue side, important aspects are how long the initial grants and public subsidies will continue and how the major funding that this often represents will be replaced from other sources of revenue. A distinction should be made between revenues earned from the core business of the telecenter (which is not fixed but generally relates to connectivity services and the provision of computers and software) and revenues which are earned from ancillary activities. It is not uncommon that the core business is not sustainable by itself and that successful telecenters over time increase the number and volume of the ancillary activities. These services, such as education and training and business services depend are more dependent on qualified staff in the telecenter who are undertaking the tasks rather than providing access to the equipment to enable the user to do the tasks him/herself. Some telecenters in Europe provide a range of business centre services for SMEs and local organisations, including inputting and analysing data, secretarial and desk-top publishing services, budget preparation and reception services. Most anticipate that this part of their business will increase as a percentage of their revenue.

Reference:

Whyte. Anne (1999), "Understanding the Role of Community Telecenters in Development - A Proposed Approach to Evaluation," in Gomez and Hunt eds. *Telecenter Evaluation*, IDRC
http://www.idrc.ca/telecentre/evaluation/n/30a_Und.html

18-3 Why sustainability of telcenters so important?

Financial sustainability of kiosks is the prerequisite for scaling-up of information kiosks. Relying on a limited amount of donors' grant is impossible when we are trying to create thousands of telecenters. We need to identify models basically relying on the financially sustainable and commercially viable models with clearly defined scheme of government subsidy on public services.

Some subsidies may be warranted

The definition of sustainability needs to be clarified in specific circumstances regarding developing countries. Some kind of public support may be warranted to preserve a kiosk, such as providing affordable access to the most vulnerable groups, providing e-government services, empowering the poor through basic computer literacy training, etc.

Community Involvement

According to experiences in the pilots, the key factor in achieving financial and operational sustainability is that the community gets involved in the making and running of kiosks. The key to success is to identify the most crucial demand for services and provide "killer applications," like market price information for farmers, land registration services, or health information system. Computer literacy training is almost always in demand and provides a large income to kiosks.

Participatory Demand Survey

The most important success factor is that kiosk managers conduct a participatory demand survey and create their business plans according to the outcome of the survey. To conduct an effective participatory demand survey and to create a business plan, there is a need for sharing experiences among kiosk managers in and across other countries.

Reference:

Kusakabe, Motoo (2003), "Knowledge Sharing and Capacity Building: Scaling up Information Kiosks. Connected for Development - Information Kiosks and Sustainability," Edited by Badshah, Akhtar, et.al. United Nations ICT Taskforce, One UN Plaza New York, NY

18-4 What are the factors influencing the financial viability of telecenters?

There are also a number of indicators of demand and economic models which have been developed to predict whether telecommunications services will be commercially viable based on the socio-economic characteristics of rural and urban areas in developing countries. These indicators are also useful for looking at telecenters.

Local community can pay 3 -5% of their income to communications

Some standard indicators of capacity to pay for telecommunications are GNP per capita; population density; penetration of electrical power in rural areas and penetration of telephone service. It has been generally accepted that rural users in developing countries are able to pay 1 to 1.5% of their gross community income on telecommunications services. In the poorest rural areas, this figure may be as high as 3% because of the lack of alternatives for communication without incurring long journeys. The ITU uses a figure of 5% of household income to estimate capacity to pay for telecommunications services.

But it is often not achieved due to collect calls and incoming calls

In reality, these figures are rarely realised for two main reasons: (i) they assume that the telecenter is accessible to everyone when they need it, meaning that it is well located, is open and is functional; and (ii) they do not take account of collect calls and people receiving incoming calls at the telecenter. In studies in Kenya, Malawi and Zimbabwe, the proportion of collect calls for outgoing calls at rural payphones was reported to be 60% (Danida, 1991). This does not account for incoming calls which are known to be common for payphones in rural and small town Africa. In Mozambique, a country with a high out-migrant population, queues of people line up outside the payphones at the weekend waiting to receive their incoming call. For a telecenter operation, this would mean that it is providing the service and incurring fixed costs but is not receiving any revenue. It has been proposed that some account should be taken of this phenomenon when assigning telecommunication charges to rural telecenters as the telecenter is in fact

co-generating the revenue that is being paid out by the caller (usually in the urban areas). In South Africa, it is reported that some telecenters charge a fee for receiving an incoming call.

World Bank Model to Estimate Financial Viability

The World Bank model for testing the feasibility of rural telecom service provision estimates average rural incomes using a formula including per capita GDP, country purchasing power parity (PPP) income distribution figures, and rural population as a percentage of total population. The result (average rural income) is compared with the estimated capital cost of providing the service per line based on population density and geographic factors and the estimated required annual revenue per line to cover capital costs and make a profit. The model then calculates the number of inhabitants required to support a single telephone line. As demand increases, the area of commercial viability also expands. This not only means that the ratio of marginal and unprofitable customers decreases but it also enables a government regulator to use the model to ensure that marginal customers are served by providing tax and fiscal incentives to the telecommunications provider (Kayani and Dymond, 1997).

Sometimes models underestimate the demand

Indicators based primarily on per capita income may be too conservative. A study in Botswana estimated the demand, penetration and revenue for an average village (1,800 population) to determine the feasibility of installing private and public phones. It was concluded that the average rural revenue would be US\$1,200 per line which was below the level required for profitability. A loss of 3% on the annual revenue of the public telecommunications corporation was predicted but five years later the demand from rural communities was more than twice the projected demand and village payphones earned up to 50% more than projected (US\$2,700 per line). There are several reasons for these indicator errors, including the difficulty of predicting demand for a service which is not yet available in the area, and the even higher costs to payphone users of the alternatives, which usually involve long journeys and uncertain probabilities of

successful results. Clearly, people place a higher value on their time than might be assumed.

Reference:

Whyte. Anne (1999), "Understanding the Role of Community Telecenters in Development - A Proposed Approach to Evaluation," in Gomez and Hunt eds. *Telecenter Evaluation*, IDRC
http://www.idrc.ca/telecentre/evaluation/nn/30a_Und.html

Kayani, Rogati and Andrew Dymond (1997), "Options for Rural Telecommunications Development" World Bank Technical Paper No. 359; World Bank, Washington DC.
http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/1997/06/01/000009265_3971201161404/Rendered/PDF/multi_page.pdf

Danida (1991), "Evaluation Report: Public Telephone Projects, Synthesis" Ministry of Foreign Affairs, Copenhagen, Denmark

18-5 How to keep the telecenter cost low?

It is without saying that one of the keys to achieving economic self-sustainability is keeping capital and recurrent cost low. Capital cost includes hardware, software, network equipment, the physical premises, setup license and connection fees, and the like. Recurrent cost lies mostly with Internet and telephone usage fees, electric power, rent, maintenance and repair, and salaries.

Reducing capital costs with new devices

At present, the most significant capital costs in offering community Internet are for hardware access equipment. A range of low cost Internet-enabled digital appliances have been developed, and these can be far cheaper, and indeed, better adapted to the developing world context in their form and function, than traditional desktop computers. While they remain the dominant access device, personal computers are inappropriate for the developing world across many dimensions, due to relatively high cost, low reliability, unsuitable user interface, environmental sensitivity, and high power consumption. Handheld appliances such as the Simputer (<http://www.simputer.org>) or Pengachu

(http://www.media.mit.edu/~rehm/pengachu/v3_document.htm) have shown that network-enabled computers can today be priced at under US\$300. Long-term research at MIT Media Lab. and elsewhere, prices next generation appliances at dollars or even pennies.

Connection Infrastructure

Additional fixed costs are due to the network infrastructure. Connection achieved via the public switched telephone network (PSTN) often carry high fixed costs. Both fixed and mobile wireless technologies fundamentally change cost structure because they reduce the time, effort, and expenses of last mile service delivery, which typically comprises the majority of all infrastructure costs. Moreover, wireless allows new entrants to compete against incumbent providers with their own facilities, and the operators have an increased incentive to maximize the number of users because the marginal cost for each additional use is lower than with wireline networks.

WLL changes telecenter sustainability

New low-cost network technologies are fundamentally rewriting equations of economic self-sustainability for rural Internet connectivity. Those rural communities within microwave radio reach of existing fibre optic cable links can effectively make use of Wireless Local Loop (WLL) last mile solution. At today's price of under US\$300 per subscriber line, WLL solutions such as the corDECT technology can provide both telephone and Internet connectivity up to 10 km away from the base station, and 25 km from a relay base station. The corDECT system is engineered primarily for low price, rather than added features, and is therefore offers 35.5/70 kbps simultaneous voice/data transmission (<http://www.tenet.res.in>).

For remote areas VSAT provides solution

For rural communities too distant from fibre backbones or in terrain too rough for the line of sight required between terrestrial microwave antennas, Very Small Aperture Terminal (VSAT) satellite connection is a common approach for connectivity. Today's price for send/receive units range from about US\$4,000 to over US\$10,000, thus making this approach inappropriate for many poor or small communities.

VHF and UHF provides a remote connectivity solutions

VHF or UHF wireless solutions are a potentially compelling option for narrowband connectivity that can also function in remote and rough terrain (<http://www.arrownetworks.net>), or relatively depopulated settings. These can cost US\$800 per subscriber line, transmit over 200 km distance, and provide upwards of 9.6 kbps connectivity.

Reference:

Best, Michael, and Colin M. Maclay (2002), "Community Internet Access in Rural Areas: Solving the Economic Sustainability Puzzle" in *The Global Information Technology Report* Edited by Geoffrey S. Kirkman, et al. Oxford University Press

18-6 What is human resource sustainability and how to measure?

The question of sustainable human resources should be asked at both the level of the individual telecenter and for the regional or national telecenter program. Shortages of adequately trained staff and loss of trained staff and technical experts to other employers, usually in the private sector, plague public sector telecenter and telecommunications programs.

Key indicators

Key indicators relate to salaries and benefits compared to those offered by competing employers, staff turnover rates, and investment in training staff. Another indicator is the number and ratio of qualified technical staff from the local area (or country) compared to imported technical expertise.

Availability of Trained People

Investment in training is another approach to measure human resource sustainability. A relatively easy indicator to obtain is the number of technical ICT training courses being provided in local (national) institutions over time, and the number of graduates or diploma students that they are producing. This will provide some measure of the pool of qualified personnel and how it is changing over time.

Ratio of Training Expenditures

Some measure of the investment in human resource training as a proportion of the overall telecenter program is another indicator of sustainability although appropriate benchmarks need to be established. The World Bank projects in information technology average about 24% of the total project costs invested in training and technical support. In the United States, the information technology industry spends between 50 and 68% on training, in a context where the basic knowledge of incoming personnel is quite high. For telecenter programs in Africa, it is almost certain that the investment in training should not be less than for developed countries and it is almost certain that it is. It is therefore

important that human resources, and particularly the training aspects, be examined as a key issue in the success and future sustainability of telecenters, both at the level of the individual telecenter and at the level of the national program agency.

Reference:

Whyte. Anne (1999), "Understanding the Role of Community Telecenters in Development - A Proposed Approach to Evaluation," in Gomez and Hunt eds. *Telecenter Evaluation*, IDRC
http://www.idrc.ca/telecentre/evaluation/n/30a_Und.html

Chapter 19 Empowerment and Capacity Building

Telecenters are often used to empower the poor and other vulnerable groups in the community. How these under-served groups should be included in the design process of the Telecenters? What are the most effective services for these groups?

Curriculum Topics:

- 19-1 How to ensure equity in telecenter operations? (Part 1)
- 19-2 How to ensure equity in telecenter operations? (Part 2)
- 19-3 How to build the internal capacity for community telecenters?
- 19-4 What types of training are most effective for telecenter staff?
- 19-5 How to cope with a high turn-over of telecenter staff?
- 19-6 How to increase capacity of community users?
- 19-7 How to create a community networking? - LINCOS experience

19-1 How to ensure equity in telecenter operations? (Part 1)

By the word “equity” we mean that the benefits of community access need to accrue to all members of the community on a fair, progressive, and equitable basis. This, by its nature, elevates issues such as gender, age, economic backgrounds, literacy levels, educational attainment, religion, race, and so forth. Of course the very question of equity of access is a highly normative stance that arises out of a particular cultural tradition.

Critical issues to consider with respect to equity of access include:

- Monitoring and disaggregation
- Operator and owner profiles
- Location and structure of facilities
- Rules and regulations
- Targeted programs and outreach
- Technologies

Equity in Gender

Let us use the example of gender, though most of these ideas and approaches described below apply to other dimensions of equity. Nancy Hafkin (2003) argues persuasively for better collection of gender-specific data and states that there are a wide range of areas where sex-disaggregated statistics will be useful.

These are important points with respect to evaluation strategies. Hafkin’s point is important: One of the first steps in ensuring equity of access is to measure access along the relevant dimensions and respond to indications of instability.

It has been reported in a number of studies that employing female operators will increase female usage (e.g. African Connection Secretariat, 2000). In the famous Grameen Phone program, researchers found that, “In the case of female respondents, 52% of female phone users responded that they preferred a woman phone owner, 2% preferred a male phone owner, and 46% had no preference; however, 82.1% of the female phone users indicated that their most recent phone call had been served by a female phone owner.” Thus, the profile of the operators and managers of a facility can influence the equity of use.

Equity by Caste

The structure and location of the community access facility can influence equity of use. For instance, Richa Kumar (2001) has studied equity of access among various caste members in the Tarahaat project in India (<http://www.tarahaat.com/>). In the initial stages, in one small village in Uttar Pradesh the Telecenter owners were dissuading

lower caste students from studying computer courses and from entering the kiosk because it was in a room in their residential house. The computer room had an independent door to the outside, and over the course of time the Tarahaat staff was able to convince them to allow access to all castes. But they did not do any canvassing in lower caste areas of the village unless forced by the Tarahaat staff and then only very reluctantly. Thus, equity of access was influenced by the location of the facility in an individual's home and also by the fact that it is placed in an upper caste area of the village (and with owner operators who demonstrated biases).

Physical layout can affect gender access

The physical layout of the facility can matter as well. Anecdotally, from the SARI (Sustainable Access to Rural India, <http://edevelopment.media.mit.edu/SARI/ma/insari.html>) project, we found that if the computer screens were turned visibly towards the streets, then women usage was increased. When the screens were hidden it increased the perception (and perhaps the reality) that pornography was being accessed and this context discouraged use by local women.

Reference:

Best, Michael L. (2004), "Community Access to Communications: Ten Questions and Provisional Answers" White Paper for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Hafkin, Nancy J. (2003), "Some Thoughts on Gender and Telecommunication/ICT Statistics and Indicators" Geneva, ITU, January 2003
http://www.itu.int/ITU-D/ict/WICT02/doc/pdf/Doc46_Erev1.pdf

African Connection Secretariat (2000), "Rural Access to Information and Communication Technologies (ICTs): The Challenge of Africa" Unpublished manuscript.

Kumar, Richa (2001), "Connecting Rural India to the Internet," in *Science, Technology and International Affairs (STIA)*, Vol. 3, Issue 3, Fall-Winter 2001-2002, p. 4, Georgetown University
<http://www.georgetown.edu/sfs/programs/stia/alumni/Fall2001News.pdf>

19-2 How to ensure equity in telecenter operations? (Part 2)

Official Code of Conduct that includes a standard non-discrimination statement

In the SARI project we have experimented with an official Code of Conduct that operators must agree to. It includes a "standard" non-discrimination statement; that users are welcome from all communities, castes, genders, etc. Furthermore, we produced a signboard which stated the non-discrimination policy with the expectation that operators will hang them in their facility. Regrettably, we have no data on whether either approach has been useful.

Targeted Programs to Ensure Equity

Targeted programs can be extremely effective in ensuring equity of access. Some operators under the SARI project have developed special programs focused on particular groups within the community. For instance, at one facility Friday afternoons are reserved for the exclusive use of local women. Some women feel more comfortable using the center only when other women are present. The program has been extremely successful.

How to build greater equity into the technology designs

Finally, the technologies themselves bias towards certain peoples and contexts and certainly there is an open research question as to how to build greater equity into the technology designs. For instance, the common personal computer running Windows requires levels of written literacy, keyboarding skills, manual dexterity, etc., that diminish the ability of many people (including the disabled and illiterate) to use them. We believe this is an open research question.

Reference:

Best, Michael L. (2004), "Community Access to Communications: Ten Questions and Provisional Answers" White Paper for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

19-3 How to build the internal capacity for community telecenters?

By the phrase “Internal Capacity,” we mean the training, skills, and capabilities of the community access center’s personnel and in particular the local manager and operator. Various skills are required of the local staff and this includes some computer literacy, people skills, marketing capabilities, entrepreneurial skills, and so forth. The problem of internal capacity has at least three principle components:

- Selection
- Training
- Retention

Young women and middle-aged men become effective managers

By selection we are meaning the process under which local staff are chosen and hired. What profile predicts success of the facility? Anecdotally, the SARI project has found that young women and middle-aged men have been the most successful local staff. The young women operators have shown significant people skills and have been able to canvas within their catchment areas and build a set of users.

The middle-aged men the SARI project staff have worked with, have often been successful serial entrepreneurs where the rural Internet facility is, perhaps, their second or third business (for instance after owning and running a tea stand). These operators seem to have learned some lessons and skills from their earlier entrepreneurial activities that carry over to the job of Telecenter operation.

But no empirical study to prove above statements



Regrettably, this anecdote, while having some explanatory power, is not born out by any of the data-driven analysis ever performed. Under 19-9 we will describe in some more detail the data and modelling ever worked on. But here let me describe two simple results we have from the SARI data.

Large Variation of Internet Use From Site To Site

One of the main response variables we are trying to explain is the variation seen in average Internet use from site to site. The average number of hours of active Internet use per month for 51 Internet facilities in the SARI project is 43 hours per week per site or, roughly, 1.7 hours per day. But this ranges from a high of nearly 8 hours per day to a low of 0 hours per day. The question is whether we can predict any of the variation in the number of Internet hours from site to site from some of the selection criteria used for the operating staff (in other words, do women do better, do seasoned entrepreneurs do better, etc.)?

Profile data do not predict Internet usage

The answer is that, in general, we cannot predict the variation in use of the Internet based upon usual elements of the profile of the operator. For instance, we attempts to fit the variable, average Internet use per site, to the operator's months of prior computer experience and months of prior work experience. One would think, at least intuitively, that these two indicators might help explain some of the variation in use at a facility with more experienced operators correlating with more use. The number of months of prior work and computer experience do not help explain the variation of Internet use in our dataset ($r=.08$ for computer experience, $r=.09$ for work experience).

Reference:

Best, Michael L. (2004), “Community Access to Communications: Ten Questions and Provisional Answers” White Paper for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

19-4 What types of training are most effective for telecenter staff?

By training we mean that, given a set of local managers and operating staff, what capacity building exercises are required to maintain sufficient local expertise. One set of researchers (Murray, Murray, & Brooks, 2001) have identified a set of Telecenter manager training activities:

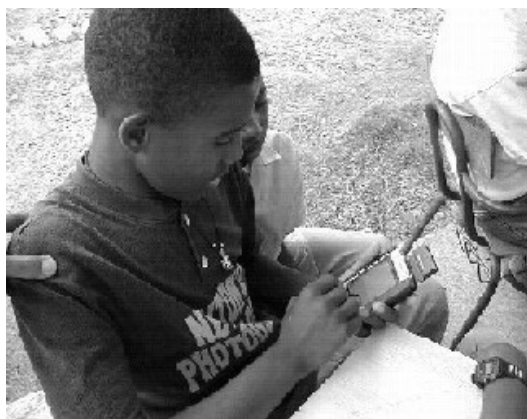
- Work-based projects or assignments
- Observing experts and colleagues
- Reading books and journals
- Open learning and self-managed learning
- Workshops, courses, seminars, or conferences

It seems critical to attend to all of these various modalities since they all have value and there is a danger in only thinking about one method (for instance a formal training course).

World Links focuses on Project-based training

One group that has focused on pedagogy in Telecenter manager training and utilizes a project- or work-based approach is World Links (<http://www.world-links.org>). While they do not put much of their curriculum into the public domain they do hold significant expertise.

Network of Colleagues is the single most effective training form



An additional form of staff training which is not identified by Murray and co-authors (though somewhat related to “Observing experts and colleagues”) is the importance of a network of colleagues. Under the SARI project, as part of the evaluation activities, the experiment was carried out so that a number of the Telecenter’s personal computers to report to the evaluation team what applications were being commonly

used. This monitoring software logs all applications as they are launched and used. The number one application, in terms of time used on the PCs, is Yahoo Messenger. And the main participants in this online dialogue were the various Telecenter operators chatting with each other. They would bring questions to each other, ideas for marketing or service expansion, and if there was a problem the first place to go for a solution was this chat environment and the other operators. Building this network of peer operators was estimated to be the single most powerful element in internal capacity building for the SARI project.

Reference:

Best, Michael L. (2004), “Community Access to Communications: Ten Questions and Provisional Answers” White Paper for International Seminar on ICT Policy Reform and Rural Communication Infrastructure sponsored by EBRD, JICA, IDRC and Keio University Aug.23-Sept.1

Murray, Bill, Cathy Murray and Simon Brooks (2001), “Training Telecentre Managers, Staff and Users,” in Colin Lachem and David Walker eds., *Telecentres: Case Studies and Key Issues*, The Commonwealth of Learning

19-5 How to cope with a high turn-over of telecenter staff?

Finally, we recognize the importance of both retention, and indeed of churn and turn-over. In many locations it will be commonplace to have significant churn in Telecenter staff. Some of the staff will not succeed and cannot expect to be in place for much more than six months.

Moving on into higher ICT value chain is a positive element

But much more the case (one hopes) is that staff find themselves quickly trained and capable of moving on from Telecenter management and operation up the ICT value chain and into better jobs. Natural attrition and natural advancement are both positive elements in terms of the overall success of the interventions and should be planned for.

Churn is a natural phenomena

Anecdotally, we have seen in the SARI project considerable churn. According to one of the India-based directors in the SARI project, “I’d say an operator lasts on an average 6 months. Maybe that’s how long it takes to learn computer skills and get another job! [One operator], for example, is onto her fifth job in three years. [Another of one of our most successful owners] hires a new person perhaps every 4 months.”

Reference:

Best, Michael L. (2004), “Community Access to Communications: Ten Questions and Provisional Answers” White Paper for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

19-6 How to increase capacity of community users?

By the phrase “external capacity,” we are referring to the skills, awareness, sensitization, and capabilities of the potential community users within the catchment area.

Good account tracking is necessary for planning the services

As with any other enterprise, basic techniques for business management and account tracking, some of which may be ICT-enabled, are essential for running a Telecenter. Small businesses often operate in an informal way, which makes important processes such as tracking spending patterns and sources, income sources, and costing, difficult. These practices negatively impact available information for managers, and therefore the decision-making and planning process, which is particularly important when offering and developing a new suite of services (and paying associated costs). Poor or incomplete records and substandard management practices adversely affect relationships with existing or potential funders, who expect (and reward) complete and accurate records.

Operators should design the business models

Operators require a sound understanding of the potential and uses of ICT, as well as the skills necessary to explain and deliver services to their users; operators effectively act not only as a provider, but also a

champion. To capitalize on their knowledge of the local community and its ICT needs, it is important for operators to understand available ICT tools, identify the resources needed to deliver the level and type of service necessary, and to design the associated business model.

Managers must be able to inspire enthusiasm for ICT

Unlike more traditional businesses in which products are more widely understood, employees may be called on to act as guides and facilitators for those unfamiliar with the technology. Managers must be able to inspire enthusiasm for ICT, as well as teach their employees the skills to instruct users. Secondary school and college students are adept facilitators, and are often willing to either volunteer or work at a Telecenter at relatively low wages, in exchange for ICT access. These types of arrangements, however, may generate a new set of challenges to managers.

Keys for External Capacity

Outreach, marketing, and interaction with the community are key elements to achieving the appropriate levels of external capacity; if word of available services does not reach wide enough or is met with resistance, success is unlikely. Outreach efforts should target businesses, individuals, non-profit and public organizations, as well as civil society groups. Creating awareness, interest, understanding, and acceptance of these new technologies is challenging, particularly in rural areas, and these components have often been closely linked to training.

Reference:

Best, Michael L. (2004), “Community Access to Communications: Ten Questions and Provisional Answers” White Paper for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Best, Michael L., & Maclay, Colin M. (2002), “Community Internet Access in Rural Areas: Solving the Economic Sustainability Puzzle” In G. Kirkman, J. Sachs, K. Schwab & P. Cornelius Eds., *The Global Information Technology Report 2001-2002: Readiness for the Networked World*. Oxford: Oxford University Press.

**19-7 How to create a
community networking?
- LINCOS experience -**

The MIT Media Laboratory has been experimenting with several different models in different settings with the goal of improving community access to digital technologies. The LINCOS telecenters are one of these projects and they have provided important and interesting lessons about the dynamics of development in the several dozen different communities where LINCOS units have been tested.

**Community-Based Approach to
Overcome Sustainability Issues**

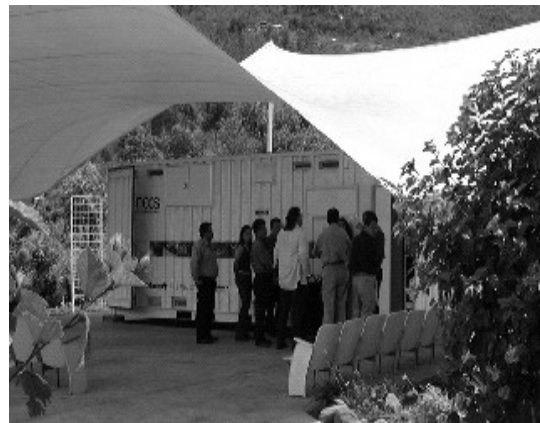
LINCOS stands for 'little intelligent communities.' It was developed as a joint project with the Costa Rican Foundation for Sustainable Development, with the goal of being a prototype for the 21st century community center. Built on used commercial containers, this high-end telecenter provided a mobile solution that can bring first-class educational material, medical advice, business communications, and the arts to every family by the use of wireless communications technologies.

The LINCOS approach relies mainly on the community's ability to organize itself around the telecenter and the services it provides. Different units in different communities have shown the LINCOS' flexibility and capacity to respond to different needs and situations, and in most of the LINCOS settings services related to education and communications have been of great demand. In terms of hardware, software and pedagogical approach, the LINCOS project has been quite successful.

However, in most cases sustainability has become a serious problem, as after a few months the organizational weakness of the community it serves starts to reflect on the unit's economic sustainability. To overcome these sustainability issues and to have a higher impact in the community we must also introduce a change in the relationship between the unit and the local business community as well as in the way we introduce these digital technologies in the community.

Start with Creating Community Networks

The MIT Media Lab. envisions progress in a community as a result of more effective relationships among its members and their positive influence on the general quality of life. The Lab. provides to those leaders with enough support to help them recognize themselves as a network and as an informal group or clique of important actors within a bigger network. Therefore, when beginning work with a community, the Lab. looks first to identify of the community structure, the key actors and their formal and informal links to the rest of the community. The Lab. begins the process by looking at the business community, looking for the main business clusters, as they are a visible and influential network that already has in place mechanisms of coordination, a common language and similar goals and values. In addition, these members usually have the potential to play important roles within other social network.



Using Digital Tools to Create Networking

Communication within this core group is then strengthened with digital tools. Social strengths, such as negotiation skills, leadership, conflict resolution, team building, interpersonal trust, etc., must be developed along with support for adoption of digital tools. Ideally, local organizations such as local business schools, business people and NGO's, should be the source of this kind of training.

The motivation to start using digital tools should be addressed at an early stage. The Lab. encourages the core group to quickly get on-line and promotes the skills to use this new media to communicate among themselves.

Finding the right tools is important because rural entrepreneurs might have different and special demands on the design and abilities of their communication tools.

Use of WiFi and Mobile Technologies

The Lab. is emphasizing the use of mobile devices with access to the Internet through 802.xx rather than the usual desktop computer, as most of the work of these people is not at a desk. The Lab. also encourages other types of text messaging exchange when available through cellular telephone coverage, as this type of coverage is becoming common and relatively cheap in many developing nations. Note that specialized software can exchange text messages among all of the different types of devices available to the community.

The adoption of these new digital communications tools brings with it the need for the infrastructure and technical support. In its operations the Lab. deploys a WiFi network to provide 802.11b-standard wireless access to the Internet; the advantage of such a network is that it can serve as a low-cost platform to enable new types of businesses and services. The LINCOS unit plays the main role as provider of technical support for the users and for the maintenance of the communications infrastructure.

Reference:

Pentland, Sandy (2004) "Little Intelligent Communities to the Marketplace of Ideas"
MIT Media Laboratory
<http://www.lincos.net/>

From Little Intelligent Communities to the Marketplace of Ideas

Alex Sandy Pentland

The MIT Media Laboratory[i] has been experimenting with several different models in different settings with the goal of improving community access to digital technologies. The LINCOS telecenters are one of these projects and they have provided important and interesting lessons about the dynamics of development in the several dozen different communities where LINCOS units have been tested.

The Media Lab LINCOS Project

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Hardware, Software, Business Ware And Human Ware

We envision progress in a community as the result of more effective relationships among its members and their positive influence in the general quality of life. We provide to those leaders with enough support to help them recognize themselves as a network and as an informal group or clique of important actors within a bigger network. Therefore, when beginning work with a community, we look first to identify of the community structure, the key actors and their formal and informal links to the rest of the community.

We begin the process by looking at the business community, looking for the main business clusters, as they are a visible and influential network that already has in place mechanisms of coordination, a common language and similar goals and values. In addition, these members usually have the potential to play important roles within other social network.

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The motivation to start using digital tools should be addressed at an early stage. We encourage the core group to quickly get on-line and promote the skills to use this new media to communicate

among themselves. Finding the right tools is important because rural entrepreneurs might have different and special demands on the design and abilities of their communication tools.

We are emphasizing use of mobile devices with access to the Internet through 802.xx rather than the usual desktop computer, as most of the work of these people is not at a desk. We also encourage other types of text messaging exchange when available through cellular telephone coverage, as this type of coverage is becoming common and relatively cheap in many developing nations^[iii]. Note that specialized software can exchange text messages among all of the different types of devices available to the community.

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The LINCOS unit plays the main role as provider of technical support for the users and for the maintenance of the communications infrastructure.

[i] www.media.mit.edu

[ii] www.lincos.net

[iii] Rheingold (2003). Smart Mobs. Perseus Publishing

Marketplace of Ideas

Prof. Alex (Sandy) Pentland
Juan Carlos Barahona

ABSTRACT

Technology and innovation are the motors of economic and social advance in any society[i], and thus there are many efforts around the globe trying to bring the benefits of digital technology to underserved communities. Telecenters of different types are being installed everywhere, usually with a lot of attention at the beginning, but after a year or two they often start to show serious operational problems related with the lack of organizational and economic sustainability. This paper proposes a novel approach to integrating telecenters into rural communities, and shows preliminary results in a rural coffee-growing village.

Keywords

Social Networks Analysis, community development, telecenters, microeconomic development, business climate, digital technologies, wireless communications.

Introduction

In rural settings, and especially developing countries, it is often difficult to argue for the benefits of digital technologies and its relation with higher levels of productivity through better coordination, communication and knowledge sharing. Many times there are a skeptical reactions from community members, who are usually focused on more traditional methods of economic development, and when it comes to arguing for provision of Internet services the skepticism becomes even greater.

The common promises about Internet for the people are:

...the opportunity to do better business through the access to international market ...prices or even next town prices for their goods;

...the possibility to deal with the local government from home;

...medical assistance provided by a faraway physician on line;

and so forth. However most villagers do not care about the international prices --- they must take the offered price in local commodities markets because of their small production size. Dealing with local government through the Internet is justifiably seen as just sending an email to an incompetent and unresponsive official in a distant municipality, and not much better than trying to 'fix' the problem through the local *babu*. And as for medical and agricultural advice, that is only useful if the local health and agricultural systems have the correct drugs and trained personnel.

People are the content

In the seemingly endless number of studies and position papers concerning the introduction of digital technology into underserved communities, the first recommendation is to obtain more local content. Perhaps the key component of the Marketplace of Ideas proposal is to recognize human contact among the villagers as the main content, at least in the early stages. The goal should be finding easy and efficient ways for them to meet and share with their friends and peers within the community. For instance, having means to distribute simple but crucial information on time, such as "I just found a "x" fungi in my field, check yours to prevent infection" or "I am going to town

with my truck half full in about an hour, who wants to use the remaining half and share the cost?” could make a world of difference.

Traditional ICT programs...the village phone or the central telecenter...are useless for communication within the community. Even if every villager has a phone it is not easy to call hundreds with such ‘opportunistic’ messages, and traditional broadcast means such as radio are inefficient because they depend on every member listening at the same time. In contrast, the asynchronous digital media (where the receiver can be view the message whenever convenient) are ideally suited for such communications. Whether by two-way pagers, or SMS messages, or Internet email, simple asynchronous messages have the potential to raise the productivity of all the producers through better coordination of their activities.^[ii]

However bringing connectivity to a rural community by providing the appropriate infrastructure for low cost communications is not enough. People need support and motivation to understand why it is worth their time and money to acquiring these new tools and learn how to use them^[iii]. Since resources are limited there is a need to seek the most effective and efficient methodologies to introduce these technologies into the community, and to spread their benefits to largest number of individuals within the community.

We argue that in rural areas, the existing social networks are the critical change agents in the community. Introduction of digital communications technologies must be done recognizing these key groups of people and connecting them to each other, allowing them to immediately find the value of the technology in the wealth of new ‘community communication content’. Our approach therefore begins by exploring the structure of the community to find the networks of influence, motivation and support among the community members.

Ideas As A Source Of Wealth

Marketplace of Ideas is a metaphor to help think of ideas as a good that is produced, imported and shared by community members. Ideas can have both value and cost. They can be registered and protected in the form of patents, trademarks and copyrights or can be given away. Ideas also have opportunity, distribution and production costs.

Wealth, innovation and economic growth are the result of ideas, collaboration and the ability to transform those ideas into valuable tools, products or services. This is true at personal, business, community and national level. Ideas come in a variety of forms, including knowledge, values, attitudes, information and coordination.

A better flow of ideas generates wealth. The new media should provide to the right people means to enhance substantially the way and frequency of their contacts and the quantity and quality of their relationships.

The Role Of Social Networks

Identifying who to start with is key for success and finding ways to later reach the highest possible number of community members is an ethical obligation. Social Network analysis could play a key role in both.

Communities are collections of superimposed social networks build of different community agents or actors and the relations or links among them. This social networks act as the distribution channel for the flow of ideas. The process of an idea flowing through a social network is critical to its usefulness.

The flow of ideas from one individual to the community and vice versa will depend on the relations or links among them. The different channels and patterns will depend on the different levels of influence of different individuals.

Since the 1930's cognitive and social psychologists have worked on the problems of sociometry and group dynamics, and have developed methods to look at group structure and at the flow of information and ideas through groups^[iv]. More recently Social Network analysis has become an important multidisciplinary field of knowledge and research^[v]. It has been used to understand better how ideas flow, how technology can help them spread more efficiently. We can use these methods to explore ways to foster growth within the Marketplace of Ideas as a method to reach the underserved members of the community.

Social Network analysis should provide a useful insight on the regularities in the relationships and the key structural properties of the community. This approach should guide an intervention to enhance the abilities of key agents and to provide better or new links. These richer networks should be a vehicle for richer and more significant content for the different categories of actors within the community.

There are already social networks sharing basic ideas, the challenge is how to strengthen and expand those networks helping the actors in the social network to link themselves in a more effective and efficient way. In other words, **how could they meet themselves and their ideas more effectively?**

We have observed that usually the most connected community and the one that is already sharing a common language is the business community. Having accurate empirical information about the social networks that are more relevant in terms of revenue generation and problem solving will help to allocate better the available resources to promote a better and more productive flow of ideas.

[i] World Economic Forum (2002) Competitiveness Report.

[ii] Hardy, A., (1980) 'The role of the telephone in economic development', Telecommunications Policy, Vol. 4, pp. 278-286.

[iii] G. Casapulla, F. de Cindio and L. Ripamonti. Community Networks and Access for All in the Era of the Free Internet in Leigh Keeble and Brian D. Loader. Community Informatics: Shaping Computer-Mediated Social Relations.

[iv] Scott, John. (2000) Social Network Analysis. SAGE Publications Ltd. Reprinted 2003.

[v] Wasserman S. and Faust K. (1994) Social Network analysis: Methods and Applications. Cambridge University press.

Chapter 20 Village Phone Program

Village Phone Shops are micro-enterprise usually run by village women to rent mobile phone to villagers. This model was created by Grameen Phone and replicated in many other places, creating jobs and revenue for mobile companies. How about the viability of this model? What are the lessons?

Curriculum Topics:

- 20-1 What is the Grameen Village Phone Program?
- 20-2 What kind of partnership is involved in Village Phone Program?
- 20-3 What is the role of Grameen Telecom?
- 20-4 Is the tariff discount system sustainable?
- 20-5 How does the Village Phone lady make money?
- 20-6 What are the programme management policies?
- 20-7 How extensive is the service coverage provided by Village Phone Program?
- 20-8 Can the Village Phone Program be replicated elsewhere?
- 20-9 What are the lessons learned?
- 20-10 What are the key results of the Village Phone Program?
- 20-11 What are the keys to success in Bangladesh?

20-1 What is the Grameen Village Phone Program?

Bangladesh continues to have one of the lowest telephone penetration rates in the world: the rate (fixed-line and cellular) was 1.32% in 2002, well behind most of its neighbours in the South Asia region. That figure is a national average: the situation is even worse in the countryside. Non-Dhaka and rural teledensity (number of telephone lines per one hundred inhabitants) was estimated to be only about 0.19% in 2000, and approximately 80% of the population lives in rural areas.

There are five telephone operators in the country, the state-owned fixed-line telephone operator (BTTB) and four mobile-phone operators: GrameenPhone, Aktel and Sheba operate GSM networks, and CityCell has a CDMA network.

The Village Phone Program is administered by one of GrameenPhone's shareholders: the not-for-profit organisation Grameen Telecom, set up by Grameen Bank. Grameen Telecom manages the programme, the training of operators (subscribers), and all service-related issues, with substantial support from Grameen Bank's national community network and the Bank's family of organisations.

The model is simple. A person, usually a woman, buys a telephone handset and subscription from Grameen Telecom with a loan secured from Grameen Bank's micro-credit facility. By retailing phone services to her fellow villagers, she gradually pays off her loan, while making a living.

In order to cover the program's administrative costs and provide an income to the subscribers, Grameen Telecom purchases bulk airtime at a discounted rate from GrameenPhone. From the perspective of Grameen Telecom, the fact

that air time is aggregated compensates for the advantageous rate offered.

Outcomes of studies conducted during the early years of the program indicated that there was a demand for telephone services in rural villages. The phones are used for a variety of family, economic and health purposes: keeping contact with family members who have left to work abroad, organizing remittance transfers, enquiring about market prices in neighbouring towns, consulting a doctor, etc.

The rapid expansion of the number of village operators over the years is the evidence that the program is profitable for the village operators and that it brings socio-economic benefits to the community as a whole.

Reference:

Tambo, Ichiro. (2004), "Grameen Village Phone Lady as Community Telecentre in Rural Bangladesh" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

20-2 What kind of partnership is involved in Village Phone Program?

Grameen Telecom is in charge of the daily administration of the Village Phone Program. Grameen Telecom purchases air-time from GrameenPhone at a discounted rate (50% discount). This discount enables Grameen Telecom to cover the costs of running the Village Phone Program, and allows the phone operator to make a profit.

GrameenPhone Ltd

GrameenPhone builds, expands and maintains the telecommunication network. GrameenPhone is also responsible for all interactions with the government: regulatory framework, interconnections, etc. Loans received from donors and shareholders supported the company's initial network roll-out and support its continued expansion.

Grameen Bank

Grameen Bank provides the financing mechanism to enable the borrower and future phone operator to purchase the handset from Grameen Telecom. Micro-credit is characterized by; (i) no collateral, (ii) poor people (especially women), (iii) frequent

instalments. Grameen Bank also helps collection of telephone bills through its nationwide community network, which the Bank has developed since its creation in 1976. Furthermore, its family companies help Grameen Telecom on technical issues.

Reference:

Tambo, Ichiro. (2004), "Grameen Village Phone Lady as Community Telecentre in Rural Bangladesh" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

20-3 What is the role of Grameen Telecom?

In the Village Phone Program, Grameen Telecom, non-profit organization, plays the central role.

Programme Management

Daily administration of the programme, co-ordination and transactions with stakeholders, arrangement of selection/subscription/training of operators, billing the operators, other managerial issues

Training of Village Phone Lady Operators

Training covers a number of topics, including from the policies and rules of the program, how to use and maintain the hardware, how to use the operations manual, etc. The information and skills needed for a profitable operation of the Village Phone businesses are provided.

All Service-Related Issues

All service-related issues are supported by Grameen Bank and its family organizations. The support provided by Grameen Bank includes:

- Translation of telephone bills in Bangla;
- If no electricity available (in Bangladesh, electricity service is limited to urban areas), Grameen Shakti (energy) provides a solar panel system; and
- If any claim arises, the necessary measures (line disconnection, etc.) are taken.

Reference:

Tambo, Ichiro. (2004), "Grameen Village Phone Lady as Community Telecentre in Rural Bangladesh" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

20-4 Is the tariff discount system sustainable?

In order to cover the program's administrative costs and provide an income to the Village Phone operator, Grameen Telecom purchases bulk airtime at a discounted rate from GrameenPhone. Aggregate air times compensate for this advantageous rate. Grameen Telecom charges a 15% commission.

For Village Phone operators, the system provides a business opportunity through mobile phone services. For the telecom service operator GrameenPhone, benefits include; guaranteed revenue without any bill collection cost, and no need to invest in a sales/billing network in rural areas, branding, etc. For Grameen Telecom, its administrative cost for the program is secured without subsidy.

For users, they do not have to make physical trips to cities where telephone services are available and they also benefit from the market rate rather than an add-on premium rate.

Reference:

Tambo, Ichiro. (2004), "Grameen Village Phone Lady as Community Telecentre in Rural Bangladesh" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

20-5 How does the Village Phone lady make money?

By retailing phone services to her fellow villagers, she gradually pays off her loan, while making a living.

Approximately 65% of operator revenue is variable cost. Marginal profit is the remaining 35%. In order to make money, she has to clear the fixed cost, of instalments (principal + interest) to Grameen Bank. As soon as she clears this, 35% marginal profit is all hers, and she can spend it to improve her living conditions, educate her children, etc.

A number of studies have concluded that the program is a profitable business for the Village Phone operators, who on average earn a net daily profit of US\$2, more than double

the average annual per capita income in Bangladesh.

Reference:

Tambo, Ichiro. (2004), "Grameen Village Phone Lady as Community Telecentre in Rural Bangladesh" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

20-6 What are the Program Management Policies?

Grameen Village Phone Program applies the following Management Policies:

Strict Rules of the Program

Criteria for the selection of operators (shop owner/central area in the village/credit history), no misuse of the program benefits (when misuse is discovered, the subscription is immediately terminated), etc.

Sequential Approach in Villages

When a mobile phone is introduced in a village, the operator is granted monopoly. In due course, however, competition is introduced.

Reference:

Tambo, Ichiro. (2004), "Grameen Village Phone Lady as Community Telecentre in Rural Bangladesh" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

20-7 How extensive is the service coverage provided by Village Phone Program?

In 1997, GrameenPhone took the lead over its competitors when it signed a long-term agreement with Bangladesh Railway to lease and rehabilitate the 1,800 km fibre-optic "backbone" network spread across the country. This backbone network construction was financed by NORAD in the 1980's. Another 900 km can be expanded along the railway.

Furthermore, the company has continuously expanded and strengthened its network of base stations whereas other telecom operators only provide service in big cities.

Strong Emphasis on Operational Excellence and Efficiency

This is reflected in the company's continuous efforts to expand network coverage and to design products and services that target the specific needs of customers with different purchasing power. Prepaid or mobile-to-mobile services and the Village Phone Program are part of a strategy to use mobile phones not only as a status symbol in the hands of the rich, but as a tool for socio-economic development in the hands of people, including the poorest, that live in remote rural areas.

Prof. Yunus and other stakeholders: Only the private sector can provide operational excellence and efficiency.

Reference:

Tambo, Ichiro. (2004), "Grameen Village Phone Lady as Community Telecentre in Rural Bangladesh" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

20-8 Can the Village Phone Program be replicated elsewhere?

According to Prof. Yunus, the Village Phone Program could work anywhere: "There are no anthropological factors or cultural differences involved. It's business." But although numerous organizations have come to visit Grameen Telecom to see how the Village Phone Program could be replicated elsewhere, the only country where the model is currently being reproduced is Uganda.

MTN Village Phone in Uganda

The Grameen Technology Center, an initiative of the Washington-based Grameen Foundation, established a 50-50 partnership with MTN Uganda, the dominant telecommunications company there, to create a new company called MTN Village Phone. Since its formal launch in November 2003, the company has deployed 200 phones in co-operation with nine micro-finance partners, with a goal of reaching 5,000 operators in five years. In fact, usage has already proved to be 25% higher than predicted, well above a sustainability baseline or break-even point. Unlike the Village Phone Program in Bangladesh, the Uganda project uses a prepaid approach, which eliminates most of the administrative costs.

World Bank Group assisted to create a sustainable model

In order to set up the replication model, the World Bank extended a loan to Grameen Foundation, which was used to fund the research in the United States and provide a start-up investment to MTN. IFC provided a grant through its SME Capacity Building Facility (CBF), whose mandate is to help transfer good models of small-business development from one country to another. Donors do not provide any subsidy to the micro-finance institutions (MFIs), to MTN or the village-phone operators. Airtime rates are not subsidised and the Uganda model is completely sustainable.

Success Factors?

- Focus on operational excellence and efficiency: Grameen Technology Center spent 3 months to note down all the business know-how of VillagePhone Program!
- MTN Uganda has an option to buy Grameen out at the end of a three-year period. As Tim Wood, the Technical Project Manager at the Grameen Technology Center, notes, the first step in starting a replication project is to identify a telecommunication partner who will build the infrastructure and who understands that it makes sense to offer a discount rate.
- Convincing the MFIs that the scheme would be profitable initially proved difficult. In Uganda, the regulatory framework was not an issue; indeed, the government was very supportive.
- The Uganda experience is proving to be an win-win model because everybody involved is making money: the private sector, the MFIs and the borrowers.

Reference:

Tambo, Ichiro. (2004), "Grameen Village Phone Lady as Community Telecentre in Rural Bangladesh" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

20-9 What are the lessons learned?

- Creative partnerships can expand infrastructure services beyond profitable areas;

- Strong leadership and ownership of the local partner are critical; and
- Synergies between business objectives and development goals are possible.

Reference:

Tambo, Ichiro. (2004), "Grameen Village Phone Lady as Community Telecentre in Rural Bangladesh" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

20-10 What are the key results of the Village Phone Program?

- Extended phone service to over 57 million people;
- Over 40,000 village phone ladies at mid 2004
 - Operator's average net income US\$58/month
 - Increase in social status of women
- Average of 57 min usage per day (incoming + outgoing)
- Good social impacts:
 - Enhanced productivity for villagers
 - Decreased impact of middlemen

- Completely profitable and self-sustaining for all parties that include operators, MFIs and telecommunications companies.

Reference:

Dymond, Andrew. (2004b), "Universal Access Funding Experience in Developing Countries" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

20-11 What are the keys to success in Bangladesh?

- High Population Density and Very Low Teledensity
- Topography
- Strength of Grameen Bank & Common "Grameen DNA" Between Organizations
- Discounted Airtime Rates from Grameen Phone
- Perseverance

Reference:

Dymond, Andrew. (2004), "Universal Access Funding Experience in Developing Countries" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

EXPLANATORY NOTE

Grameen Village Phone Lady as Community Telecentre in Rural Bangladesh

By Ichiro Tambo, Adviser on Science and Technology, OECD/DAC

Q1. Bangladesh, what is the general situation?

N/A

Q2. What is the situation of the telecom sector?

- 5 operators

There are five telephone operators in the country, the state-owned fixed-line telephone operator (BTTB) and four mobile-phone operators: GrameenPhone, Aktel and Sheba operate GSM networks, and CityCell has a CDMA network.

- Teledensity in South Asia, 2002

Bangladesh continues to have one of the lowest telephone penetration rates in the world: the rate (fixed line and cellular) was 1.32% in 2002, well behind most of its neighbours in the South Asia region. That figure is a national average: the situation is even worse in the countryside. Non-Dhaka and rural teledensity (number of telephone lines per one hundred inhabitants) was estimated to be only about 0.19% in 2000 – and approximately 80% of the population lives in rural areas.

Q3. What is the Village Phone Programme?

- Administered by Grameen Telecom, not-for-profit company

Use of special purpose organisation

The Village Phone Programme is administered by one of GrameenPhone's shareholders: the not-for-profit organisation Grameen Telecom, set up by Grameen Bank. Grameen Telecom manages the programme, the training of operators (subscribers), and all service-related issues, with substantial support from Grameen Bank's national community network and the Bank's family of organisations.

- Brief Business Model

- A person, usually a woman, buys a telephone handset and subscription
- Grameen Bank provides the person with necessary financing
- She retails phone services to villagers
- Through retailing, she pays off her loan and makes a living
- She benefits from a discount tariff

The model is simple. A person, usually a woman, buys a telephone handset and subscription from Grameen Telecom with a loan secured from Grameen Bank's micro-credit facility. By retailing phone services to her fellow villagers, she gradually pays off her loan, while making a living. In order to cover the programme's administrative costs and provide an income to the subscribers, Grameen Telecom purchases bulk airtime at a discounted rate from GrameenPhone. From the perspective of Grameen Telecom, the fact that air time is aggregated compensates for the advantageous rate offered. Outcomes of studies conducted during the early years of the programme indicated that there was a demand for telephone services in rural villages. The phones are used for a variety of family, economic and health purposes: keeping contact with family members who have

left to work abroad, organising remittance transfers, enquiring about market prices in neighbouring towns, consulting a doctor, etc. The rapid expansion of the number of village operators over the years is evidence that the programme is profitable for the village operators and that it brings socio-economic benefits to the community as a whole.

Q4. What kind of partnership is involved?

- Programme administration: Grameen Telecom

Grameen Telecom is in charge of the daily administration of the Village Phone Programme. Grameen Telecom purchases air-time from GrameenPhone at a discounted rate (50% discount). This discount enables Grameen Telecom to cover the costs of running the Village Phone Programme, and allows the phone operator to make a profit.

- Telecom Service provision: GrameenPhone Ltd

GrameenPhone builds, expands and maintains the telecommunication network. GrameenPhone is also responsible for all interactions with the government: regulatory framework, interconnections, etc. Loans received from donors and shareholders supported the company's initial network roll-out and support its continued expansion.

- Micro-credit and Support; Grameen Bank

Grameen Bank provides the financing mechanism to enable the borrower and future phone operator to purchase the handset from Grameen Telecom. Micro-credit is characterised by; 1) no collateral, 2) poor people (especially women), 3) frequent instalments. Grameen Bank also helps collection of telephone bills through its nationwide community network, that the Bank has developed since its creation in 1976. Furthermore, its family companies help Grameen Telecom on technical issues.

Q5. What is the role of Grameen Telecom?

- Programme management

Daily administration of the programme, co-ordination and transactions with stakeholders, arrangement of selection/subscription/training of operators, billing the operators, other managerial issues

- Training of Village Phone ladies (operators)

Training covers a number of topics, including from the policies and rules of the programme, how to use and maintain the hardware, how to use the operations manual, etc. The information and skills needed for a profitable operation of the Village Phone businesses are provided.

- All service-related issues

Supported by Grameen Bank and its family organisations

Translation of telephone bills in Bangla

If no electricity available (in Bangladesh, electricity service is limited to urban areas), Grameen Shakti (energy) provides a solar panel system.

If any claims arise, the necessary measures (line disconnection, etc.) are taken.

Q6. How does the tariff discount work?

By retailing phone services to fellow villagers, the Village Phone operator gradually pays off her loan, while making a living. In order to cover the programme's administrative costs and provide an income to the Village Phone operator, Grameen Telecom purchases bulk airtime at a discounted rate from GrameenPhone. Aggregate air times compensate for this advantageous rate. Grameen Telecom charges a 15 % commission.

Q7. Is this discount system sustainable?

- VP ladies: business opportunities

For Village Phone operators, the system provides a business opportunity through mobile phone services.

- GrameenPhone: guaranteed revenue/no extra cost

For the telecom service operator GrameenPhone, benefits include; guaranteed revenue without any bill collection cost, and no need to invest in a sales/billing network in rural areas, branding, etc.

- Grameen Telecom: Cost recovery/no subsidy

For Grameen Telecom, its administrative cost for the programme is secured without subsidy.

- Phone users: no physical trips/phone calls at market rate

For users, they do not have to make physical trips to cities where telephone services are available and they also benefit from the market rate rather than an add-on premium rate.

Q8. How does the Village Phone lady make money?

By retailing phone services to her fellow villagers, she gradually pays off her loan, while making a living. Approximately 65 % of operator revenue is variable cost. Marginal profit is the remaining 35 %. In order to make money, she has to clear the fixed cost, of instalments (principal + interest) to Grameen Bank. As soon as she clears this, 35 % marginal profit is all hers, and she can spend it to improve her living conditions, educate her children, etc. A number of studies have concluded that the programme is a profitable business for the Village Phone operators, who on average earn a net daily profit of US\$2, more than double the average annual per capita income in Bangladesh.

Q9. What is the Programme Management Policy?

- Strict rules of the programme

Criteria for the selection of operators (shop owner/central area in the village/credit history), no misuse of the programme benefits (when misuse is discovered, the subscription is immediately terminated), etc.

- Sequential approach in villages

Monopoly to Competition. When a mobile phone is introduced in a village, the operator is granted monopoly. In due course, competition is introduced.

Q10. How is extensive service coverage provided?

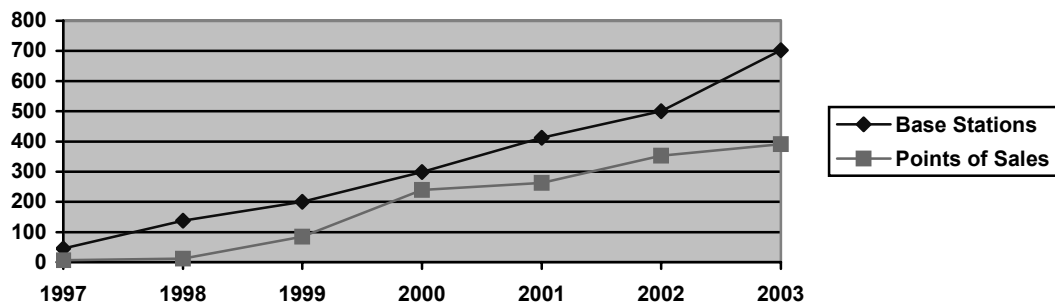
- 1,800 km fiber optic backbone

In 1997, GrameenPhone took the lead over its competitors when it signed a long-term agreement with Bangladesh Railway to lease and rehabilitate the 1,800-kilometer fibre-optic 'backbone' network spread across the country. This backbone network construction was financed by NORAD in the 1980's. Another 900 km can be expanded along the railway.

- Continuous increase in the number of base stations

Furthermore, the company has continuously expanded and strengthened its network of base stations.

GrameenPhone Base Stations and Points of Sale, 1997–2003



Sources: GrameenPhone, Annual Reports, 1998–2002; GrameenPhone, Presentation to the Investors' Forum, Kuala Lumpur, 8 January 2004

Whereas other telecom operators only provide service in big cities.

- Strong emphasis on operational excellence and efficiency

This is reflected in the company's continuous efforts to expand network coverage and to design products and services that target the specific needs of customers with different purchasing power. Prepaid or mobile-to-mobile services and the Village Phone Programme are part of a strategy to use mobile phones not only as a status symbol in the hands of the rich, but as a tool for socio-economic development in the hands of people, including the poorest, that live in remote rural areas. Professor Yunus and other stakeholders: Only the private sector can provide operational excellence and efficiency.

Q11. Can this be replicated elsewhere?

- MTN Village Phone in Uganda

According to Professor Yunus, the Village Phone Programme could work anywhere: "There are no anthropological factors or cultural differences involved. It's business". But although numerous organisations have come to visit Grameen Telecom to see how the Village Phone Programme could be replicated elsewhere, the only country where the model is currently being reproduced is Uganda. The Grameen Technology Center, an initiative of the Washington-based Grameen Foundation, established a 50-50 partnership with MTN Uganda, the dominant telecommunications company there, to create a new company called MTN Village Phone. Since its formal launch in November 2003, the company has deployed 200 phones in co-operation with nine micro-finance partners, with a goal of reaching 5,000 operators in five years. In fact, usage has already proved to be 25% higher than predicted, well above a sustainability baseline or break-even point. Unlike the Village Phone Programme in Bangladesh, the Uganda project uses a prepaid approach, which eliminates most of the administrative costs. In order to set up the replication model, the World Bank extended a loan to Grameen Foundation, which was used to fund the research in the US and provide a start-up investment to MTN. IFC provided a grant through its SME Capacity Building Facility (CBF), whose mandate is to help transfer good models of small-business development from one country to the other. Donors do not provide any subsidy to the micro-finance institutions (MFIs), to MTN or the village-phone operators. Airtime rates are not subsidised and the Uganda model is completely sustainable.

- Success factors?

Focus on operational excellence and efficiency – Grameen Technology Center spent 3 months to note down all the business know-how of VillagePhone Programme! MTN Uganda has an option to buy Grameen out at the end of a three-year period. As Tim Wood, the Technical Project Manager at the Grameen Technology Center, notes, the first step in starting a replication project is to identify a telecommunication partner who will build the infrastructure and who understands that it makes sense to offer a discount rate. Convincing the MFIs that the scheme would be profitable initially proved difficult. In Uganda, the regulatory framework was not an issue;

indeed, the government was very supportive. The Uganda experience is proving to be a win-win model because everybody involved is making money: the private sector, the MFIs and the borrowers.

- Other replication initiatives in Latin America

Q12. What are the lessons learned?

- Creative partnerships can expand infrastructure services beyond profitable areas;
- Strong leadership and ownership of the local partner are critical;
- Synergies between business objectives and development goals are possible.

Chapter 21 Telecenter Evaluation

Community telecenters are a public access point for telephone, email and Internet. In addition, it can offer various social and economic services to the rural communities. What are the roles of community telecenters? How to create them?

Curriculum Topics:

- 21-1 How to monitor and evaluate telecentres?
- 22-2 How to measure the impact of telecenters?
- 23-3 How to measure overall performance of telecenters?
- 24-4 What are the critical success factors of e-community centers?

21-1 How to monitor and evaluate telecentres?

Weak monitoring, evaluation, and assessment have been a significant challenge to the telecenter movement. As Whyte (2000) aptly notes, “evaluation studies are urgently needed to provide an assessment of the role and impact of community telecenters, as organizations and donors are implementing these facilities” without an adequate understanding of how well they respond to the communication and information needs or of their impacts on social equity and economic development.

Here are some of the critical elements to monitoring and evaluation. They include:

- Start early and monitor often. It may make sense to begin baseline and preliminary assessments well before the facilities are ever in place.
- Be sure to bring into the evaluation mix control communities (for instance comparable communities that are not part of the intervention).
- Develop methodologies that are based on clear theoretical foundations (e.g. Roman 2003).
- Develop consistent research frames, instruments, and a broad powerful range of indicators (Whyte, 2000).
- Disaggregate data along appropriate dimensions of equity.

- Pay very close attention to data quality (which is often quite poor) (Roman & Colle, 2002).
- Quantitative and objective measures that are amenable to statistical modeling can help ensure robust results (though it is easy to lie with statistics).
- Qualitative and observational data can reveal truths that are not available to quantitative approaches (though it is easy to be misled by anecdotes).

SARI Project collected data systematically

In monitoring and evaluating the SARI project Best (2004) has focused on quantitative and statistical modeling. He has an extremely broad set of data inputs; indeed it may be the richest dataset from any community access project. His data streams include:

- Household surveys
- Operator surveys
- User surveys
- Instrumented PC's
- Internet meter reads
- Maintenance logs
- Daily usage reports
- Government usage reports
- Baseline surveys
- Payment reports

Data quality

Data quality in most all measures has been a constant and considerable challenge. For instance, we wish to measure the amount of time each telecenter spends using the Internet.

happily, we are able to do this precisely by reading the ISP's Internet meters which clock activity. We also have asked the operators to track daily (and also retrospectively) their Internet usage (amongst many other variables). The average level of under-reporting of Internet usage is 1:13. In other words, for every minute that the operator reports using the Internet we know through the ISP meter reads that they have used it for 13 minutes.

Regression model to explain Internet usage

Best (2004) has been developing a regression model by least squares. He has a response (or dependent variable) that he wishes to explain with a collection of regressors (or explanatory variables). The response is the average number of Internet hours used per kiosk per month. We saw this response in Category "Capacity Building." (This data comes from the ISP meter and so is of a very high quality.) We have been using this variable as a surrogate measure on all activity from the telecenter; we believe that the more Internet activity the more activity in general.

Use of the facility actually decreases if the operator has more prior work experience

Thus, the model suggests that the variation in use of the Internet from facility to facility can be explained by noting that telecenters use more Internet time if:

- (1) They are in larger villages;
- (2) The villages have a higher proportion of Hindus; and
- (3) The village has less phones.

Furthermore, the use of the Internet goes up if the telecenter operator owns;

- Land (a good indicator of general wealth);
- The telecenter by him/herself, however,
- The use of the facility actually decreases if the operator has more prior work experience.

Reference:

Best, Michael L. (2004), "Community Access to Communications: Ten Questions and Provisional Answers" White Paper for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Roman, Raul (2003), "Diffusion of Innovations as a Theoretical Framework for Telecenters" in Information Technologies and International Development, vol.1(2), December 2003, pp.53-66

Whyte, Anne (2000), *Assessing Community Telecentres Guidelines for Researchers*. Ottawa: IDRC.

Roman, Raul and Royal D. Colle (2002), "Themes and Issues in Telecentre Sustainability," Development Informatics Working Paper No. 10, January 2002 http://www.sed.manchester.ac.uk/idpm/publications/wp/di/di_wp10.pdf

21-2 How to measure the impact of telecenters?

Measures of impact on individuals, organizations and on the community collectively are a key objective for most evaluation studies. They relate to some of the most important research questions for many stakeholders, within the community, at national program level, and for international donors. Is the telecenter a positive force for community development? Does it benefit some people more than others? Does it act as a catalyst for other positive initiatives and innovations at local level? Does it help people to help themselves? These questions convey the assumptions and vision of the promoters and funders of telecenter programs.

Difficulty in Measuring Impacts: Causality

One of the big conundrums in measuring impacts is the question of causality. Did the telecenter contribute to a rise in the local economic productivity, or to the greater participation of women in local organizations, or were these prior economic and social changes that themselves were the catalysts for the telecenter being located in that community? Clearly, economic potential local leadership, and community initiative are factors in deciding where telecenters are to be located, even for those telecenter programs where the "public good" rationale is strongest. The best one can usually do, given that these are generally small scale surveys and not large data sets capable of endless statistical manipulation, is to obtain good baseline data on the community; to measure succeeding changes carefully; to demonstrate a strong association between the telecenter and the economic and social changes found; and to apply the argument of "reasonableness" in judging the likely direction of causality. The case will be considerably strengthened if there

are supporting data from several telecenter sites and from “control” communities without telecenters. It is in this area where regional comparisons and consistency in measuring indicators will produce the greatest pay-off.

Economic Impacts - National Level

There have been a number of statistical studies which have analysed longitudinal data from the United States and other 60 countries to measure the correlation between increased investment in telecommunications and in per capita GDP or GNP. These have found that there are causal relationships in both directions, and that the contribution of telecommunications to productivity can be measured at both the aggregate level of the national economy and for particular economic sectors. An important characteristic of telecommunications is that each user’s potential benefit rises as the total number of users increases - the opposite of the tragedy of the commons. Another is that although both parties to a telephone call will benefit from the communication, generally only one party pays directly for the call. The general thrust of the studies done in telecommunications in developing countries, where the relative gains in cost-effective communications are initially high are that the projects produce major benefits in efficiency and productivity as well as public-good benefits. These benefits include better price information, reduction of downtime when equipment is broken or needs maintenance, reduction of inventory, timely delivery of products to market, reduction of travel costs and energy savings (Hudson, 1998).

Economic Impacts - Community Level

How to translate these to the community level where one is largely dependent on primary data that can be collected by the evaluation team? Household level economic data about income, savings etc. are sometimes difficult to obtain and to cross-check. Strategies to deal with this problem include; (i) the use of key informants who are motivated to help the evaluation team; (ii) to use indirect measures of wealth accumulation (such as owning consumer goods like radio, television, refrigerator, bicycle), which can also sometimes be observed directly (for example: new house construction); (iii) to ask questions relating to spending patterns rather than savings; and (iv) where possible to use available statistics (e.g. local market prices). A

valuable complement to household survey data is to ask a panel of representative households to record a household budget of income and expenditures using a specially designed booklet. Clearly the best data on impacts will come from longitudinal studies which can measure changes from a pre-telecentre baseline situation. Many of the indicators assume therefore that measures of change will be taken at different times.

Social Impacts

Social indicators highlight another measurement issue: the need to define the indicator somewhere between “bottom-line” social measures like mortality rates, which if the telecenter has any contribution to make, will be impossible to separate out from all the other contributing causes; and direct impacts on behaviour, such as the number of telephone calls made per household per month, which can probably be easily measured but doesn’t necessarily have great significance as a social impact. The indicators suggested in table 12 are drawn from many possible ones, selected for probable data availability and relevance. Some of the indicators can be measured directly; others will be measures of attitudes and values. It is recommended that a panel of households or individuals be established to keep time-budget diaries. These will provide a wealth of information on changing social behaviour and patterns and are rewarding also for those who agree to keep them. Schoolchildren are one group who can be encouraged to keep time diaries as a school project. Others who are willing to participate may be members, and leaders of local organisations who, with appropriate explanation, can understand the purpose and value of collecting these data.

Impacts on Organisations

While many of the same indicators proposed for individuals and households can be used to measure change for organisations, their importance to the development and life of the community and the analysis of telecenters suggests that organizations should be accorded special attention in the evaluation study. Formal organizations that are important in communities include institutions like schools, chambers of commerce and health clinics; businesses that are more than a one-person operation and have hired staff; and community organisations, NGOs and committees that have some formal structure and mandate.

Information and communication are critical to the success of any formal organization so that savings in time and money, together with better performance and reliability are key questions for the evaluation. As for individuals and households, indicators can be direct measures of telecenter use and impacts and how spokespersons perceive the costs and benefits to them. The impacts will relate to the efficiency of the organisation, the outcomes it achieves, its decision-making processes and the decisions made, as well as how effective its networking and information sources are for reaching its organisational goals.

Reference:

Whyte. Anne (1999), "Understanding the Role of Community Telecenters in Development - A Proposed Approach to Evaluation," in Gomez and Hunt eds. *Telecenter Evaluation*, IDRC
http://www.idrc.ca/telecentre/evaluation/nn/30a_Und.html

Hudson, Heather E. (1998), "Universal Access to Information and Communications Technologies for Sustainable Development: Economic Issues and Strategies" Report to IDRC, Canada

21-3 How to measure overall performance of telecenters?

Telecenter performance has two important yardsticks against which it should be measured: (i) the telecenter's own goals and performance targets, as set out in its business plan, mission statement or program proposal documents; and (ii) the needs and satisfactions of its users. The value of having common core indicators for measurement is that one telecenter's performance (or one national program) can be objectively compared to another in a cross-sectional analysis; and changes in the performance of individual telecenters or national programs can be reliably measured over time. The proposed indicators are grouped into: (1) basic telecenter parameters; (2) indicators of demand for services; (3) service performance; and (4) indicators of user behaviour and perceptions.

(1) Basic Telecenter Parameters

There are a number of qualitative and quantitative parameters which together describe the telecenter: its location, origin, ownership management, facilities and equipment, staff and services. Also important to this description is the telecenter's funding sources and revenue generation. Some indicators are designed to be repeated over time to measure changes in the telecenter; it has been shown that the start-up phase (usually the first year) and subsequent operational years are generally very different in these indicators. Telecentre services tend to expand, especially in business support activities, and public funding and grants usually decline or end after an initial 1-3 year start-up phase.

Behind the measures proposed here, lie a number of hypotheses about possible success factors which can be tested when different telecenters are compared. For example, the degree of community involvement in, and commitment to, a telecenter, is often assumed to be a success factor. This is measured in terms of the community's role in the origin of the telecenter, its ownership and management, as well as their satisfaction with its performance and basic community characteristics. It is reported that telecenters that are set up through international donor initiatives or public programs rather than being community-driven or the result of local entrepreneurship have a more difficult time being financially viable after the initial funding runs out (ITU, 1998).

(2) Indicators of Demand for Services

Measures of demand for telecenter services should be included in the baseline community survey and also preferably in any feasibility study undertaken before the telecenter project is underway. The indicators will also measure changing demand for services as the telecenter becomes established and better known.

(3) Service Performance Indicators

The performance of a telecenter in providing the services it offers results from a combination of equipment and human performance, set within a broader context of the quality and reliability of power and telecommunications infrastructure and financial structure. Many of the indicators proposed present these different components in terms of the service experienced by the user. The telecenter manager will need to work

back from these indicators to identify the source of any problems in service delivery. Sometimes the cause will be equipment malfunctions or breaks in power supply or telecommunications connectivity. Sometimes there will be major “downtime” resulting from theft or vandalism. Service performance is also related to how the telecenter is managed and staffed. Telecenter staff play a key role in providing user-friendly technical support to users, in ensuring good administration and risk management, and in educating people to adopt appropriate user behaviour. Service performance is also related to telecenter design, both in the type and quality of equipment purchased, the maintenance contracts bought, in relation to the anticipated demand for services. One basic parameter critical to equipment performance is the total population (or number of users) that it is supposed to serve, and the amount of time any equipment is in use.

(4) Indicators of User Behaviour and Perceptions

While they will only give a partial picture of the role of the telecenter in the community as a whole, measures of user behaviour and perceptions are at the heart of any evaluation of telecenters. User surveys are likely to be cost-effective: they can be conducted at the telecenter, the participants have an interest and are knowledgeable about the topic, and longitudinal data can be obtained if users are given an identity code and respond to a short survey on each visit. It is worth considering having a panel of users who will form a longitudinal sample in addition to random sampling or user log-in procedures. This will provide a measure of change over time in a number of variables such as telecenter services used, frequency and length of visits, and payment per visit, as well as changes in satisfaction and perceived benefits. From telecenter users, two groups of indicators can be obtained: reports on behaviour (what services were used on each visit, for what purposes etc.) and subjective measures of their perceptions about the telecenter services and its benefits for them. These indicators need to be capable of analysis by individual and group characteristics (age, gender, educational level, occupation, membership in organisations, etc.) so basic data should be collected on the user respondent when he/she first agrees to take part in the user survey. The data from user surveys will be compared with the data

collected by telecenter staff on performance and will provide both cross-checks and information from different stakeholder perspectives. Collecting data from users while they are at the telecenter increases its accuracy and there is a shared goal to use the information to improve the services provided.

Reference:

Whyte. Anne (1999), “Understanding the Role of Community Telecenters in Development - A Proposed Approach to Evaluation,” in Gomez and Hunt eds. *Telecenter Evaluation*, IDRC
http://www.idrc.ca/telecentre/evaluation/nn/30a_Und.html

ITU (1998), Seminar on Multipurpose Community Telecentres ; Budapest, 7-9 December 1998

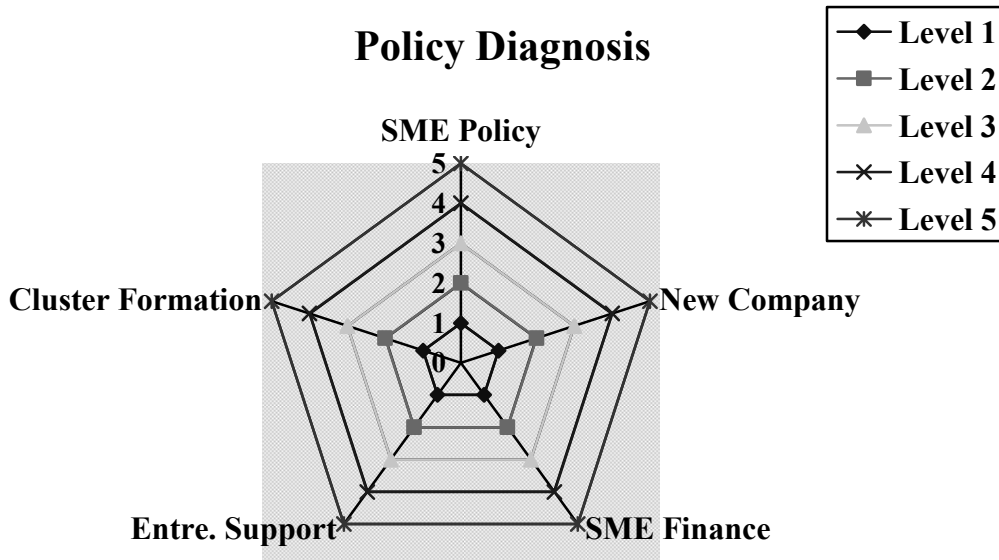
21-4 What are the critical success factors of e-community centers?

Critical success factors of e-community centers are as follows:

- (i) Plan well based on information needs of the community,
- (ii) Involve key stakeholders from the planning stage, after analyzing stakeholders thoroughly,
- (iii) Equip minimum ICT tools per e-community site,
- (iv) Train supervisors and community people on using ICT tools,
- (v) Develop community websites with efficient information gathering, analysis, repackaging, and dissemination mechanism,
- (vi) Adopt and modify sustainable business model,
- (vii) Ensure community ownership, secure supporters, and find a champion, and
- (viii) Critically evaluate efforts, report back to stakeholders, and adapt as needed.

Reference:

Lee, Jeoung-Keun (2004), “ADB’s Experience in Supporting e-Community Centers” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure



ICT Clusters	
Question 16. Government policy on small businesses	
What is the government policy towards the small businesses and entrepreneurs?	
Level 1	There is no national or regional institution responsible for small business policy and strategy development. Government has no approved strategy for small businesses.
Level 2	Government established an institution responsible for policy/strategy for small business development, but it has an insufficient budget, personnel, and authority. Government has an approved strategy for small businesses but it is not adequately communicated and implemented.
Level 3	Small business administration is established with adequate budget and personnel. Small business development strategy has been approved and implemented.
Level 4	Small business administration has an adequate communication mechanism for local entrepreneurs and the government policy and strategy changes are consulted with the small business sector effectively.
Level 5	Small business administration has been operating stably for a few years with clearly defined benchmarks for their policy objectives and monitors the progress according to the benchmark. There are participatory mechanisms through planning, implementation, and monitoring stages.

Question 17. New Company Registration

What is the regulatory framework for a new company to be registered?

Level 1	There are more than 5 licensing and registration requirements for start-up businesses. Days to register a company exceed 50 days. Cost to register a company exceeds \$500. Minimum paid-in capital for limited liability companies exceeds \$3000.
Level 2	Government has started a simplification process of licensing and registration process, but not yet effectively changed the process.
Level 3	Government established a single registration form or institution to register a company.
Level 4	The single registration process actually reduces the days, cost of registration to a benchmark of good practice; less than three days and less than \$210. Government adopted the policy of automatic approval, if there is no response within certain days.
Level 5	Process of licensing and registration has been comprehensively reviewed and simplified not only for the initial set up of a company but also throughout the operation of a company, including building permit, environmental, and industrial standards. There is an effective monitoring system for informal activities and bribes.

Question 18. Financing for Small Businesses

How easy is it for a small business to finance their activities?

Level 1	Banking sector is under-developed (M2 less than 30% of GDP) and small businesses face difficulties in receiving funding, from the lack of a regulatory framework for collateral registration and lack of credit analysis skills based upon cash-flows. Dedicated microfinance institutions are not existent.
Level 2	Secured transaction legislation has been enacted and land registry system has become operative. Banks are implementing a training on cash flow-based credit analysis. Micro-credit institutions have begun to be operative.
Level 3	Banks have introduced a procedure for SME financing based on the cash-flow analysis. Land and movable collaterals are easily set up. Microfinance institutions are increasing its operations and achieving self-sustainable operation under a regulatory framework.
Level 4	There are different types of small business financing available, such as leasing, seed capital, and early-stage venture capital funds. The Stock market has begun to develop (stocks traded more than 3% of GDP), Credit bureau has become operative. Banking regulations are developed and implemented.
Level 5	Domestic credit to the private sector has grown more than 30% of GDP. Small businesses are not subject to unfair financing limitation. Legislation on bankruptcy and corporate laws has been developed. Corporate governance has become improved and IAS is used as the standard accounting rule and financial statements generally accurately represent the true financial state of the corporation.

Question 19. Entrepreneur support quality

What is the quality of support to entrepreneurs?

Level 1	There is no systematic advisory service to entrepreneurs. There are no business incubators.
Level 2	There are some business advisory activities provided by the governmental organizations, and/or private sector institutions.
Level 3	Business advisory services are operated efficiently through a commercialized way and encouraged to be financially sustainable with reasonable charges.
Level 4	Business advisory services provide a diversified range of services based on a careful demand survey. They can provide services, such as partner searching, marketing, legal services, specialized training, etc. Advisory service and financing should be linked.
Level 5	Involving university as a core of comprehensive entrepreneur support, including IPR transfer, entrepreneurial education, technical advisory service, incubation and venture capital financing, and matching of entrepreneurs, angels, and management team. Incubators are run by transparent business principles and creating an international networking with other incubators.

Question 20. Cluster Formation

To what extent does the region enjoy the merit of industrial cluster?

Level 1	The region does not have a concentration of firms with highly specialized skills. There are no entrepreneurial support functions in the region.
Level 2	The region started to have a concentration of high-tech firms. Business advisory, financing and other professional services are also existing.
Level 3	The region has a high concentration of high-tech businesses with mutually synergistic interaction. Professional financial and managerial service functions, such as venture capital funds, accounting, consulting, and law firms have developed.
Level 4	University and/or research institutions provide a core of information and knowledge exchange in the region. University provides its IPR to entrepreneurs and offers entrepreneurs education, financial support, and joint research programs to provide a total entrepreneurship support functions.
Level 5	There are formal and informal social cultural networks to promote young entrepreneurs to be mentored and have access to information and capital. Voluntary organizations are developed to encourage cultural activities and promote social cohesion. Region attracts not only economic activities but also governmental services, health facilities, cultural events and amenities to enjoy life.

Chapter 22 Industrial Clusters

Industrial clusters are regional concentration of small businesses, which usually specialized in technology-intensive processes and designs. Better human communications due to geographical proximity and close division of labor provide a competitive edge to the cluster members. How a cluster does function?

Curriculum Topics:

- 22-1 So what are clusters?
- 22-2 What are industrial clusters?
- 22-3 How is an industry cluster different from the classic definition of industry sectors?
- 22-4 What are the critical dimensions of a regional cluster?
- 22-5 Why is the development of regional clusters so important for policy-makers?
- 22-6 What role can institutional support structures play?
- 22-7 Is there a historical pattern to cluster development?
- 22-8 What helps ICT clusters to start and grow?
- 22-9 How does clustering help rural development?
- 22-10 How does clustering and ICT help rural development?
- 22-11 Are there good examples of rural clustering including the use of ICT?
- 22-12 What are the problems and challenges facing clusters?
- 22-13 What key lessons for policy development can we learn from our overview of cluster development?

22-1 So what are clusters?

Does the term “cluster” describe the way we live and work or what businesses do anyway? Or does it have something to do with academic curiosity because we are referring to management challenges in the new economy? Clusters are about all of those issues but they are encapsulated in the standard definitions used by various writers on the subject to denote:

A. Geographical Concentration of Related Industries

A spatial or geographical concentration of businesses (large and small) either in a particular industry or a set of related industries is called “cluster.” Typically if there is a concentration of firms in one industry they are known as industrial districts, as in the

knitwear cluster in Modena in Italy. The Silicon Valley is an example of clusters containing many firms from related industries, such as IT, telecommunications, venture capital, bio-technology, etc. Such a concentration also includes the value and supply chains of business, buyers, suppliers, distributors, educational institutions and government agencies etc.;

B. Close Proximity Reducing Transaction Cost

A close geographical proximity of businesses and support organizations, which allow for easier business transactions, reduction of transaction costs, and the sharing of knowledge and information;

C. Knowledge Spill over

The development of a learning environment through what is described as Knowledge Pullovers or the availability of knowledge across the cluster and its constituent organisations because of their close proximity and also because of the dependence on each other for mutual gain.

Why firms choose to concentrate?

The reasons why businesses choose to concentrate in one geographical area are many and have historical explanations. While in the past the availability of natural resources in an area may have firms together and share a local knowledge base, today Knowledge itself (of technologies, of a process, or of design) as a factor of production attracts those who share the know-how to learn from each other while competing with each other, too! This results in specialization within an area, where we no longer just have a concentration of businesses but a concentration of ideas, technologies, know-how, venture resources, related skills, etc.

Reference:

Mitra, Jayanta (2004), “ Building Entrepreneurial Regional Clusters: An Overview” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

22-2 What are industrial clusters?

Industrial clustering means geographic concentration of the related industries within a relatively narrow area. The relationship among these firms is usually of complementary or competing engaging in upstream and downstream operations in the same industry. Sometimes, they are the collection of firms designing, prototyping, manufacturing and marketing of products. In most of the cases, clusters are groups of small and medium-sized firms of interdependent industries that drive wealth creation in a region. The total of the cluster as a system exhibits far more efficiency, flexibility and innovativeness than a simple sum of individual companies.

Silicon Valley: Cluster of ICT Industries

In the ICT industries, Silicon Valley, California is the typical industrial cluster where there is high concentration of innovative and dynamic industries in IC,

communication devices, software and its applications. They are supported by other entrepreneurial support mechanisms, such as venture capitals and research institutions in the cluster.

Como (Italy): Cluster of Fashion Textile Industry

In the textile industries, Como in Northern Italy is a famous cluster for the production of neckties, scarf, and ladies’ garments which are conducted by hundreds of small manufacturers with high sophistication and specialization in design, dyeing, combing, tailoring and each process is further subdivided into highly specialized components with sophisticated division of labour.

Kamata, Tokyo (Japan): Cluster of Metal and Plastic Processing Industries

Another example is a cluster of metal processing and plastic fabrication industries in Tokyo, Kamata district. More than 10,000 small firms with high skills are interacting with each other to create a flexible and innovative basic manufacturing and prototyping works to support the high quality Japanese electronics industries.

Why is a cluster of small firms more efficient than a large company?

If there is a stable demand and stable technology, scale merit of the production will dictate the creation of vertically-integrated large companies engaging in mass production. A collection of small companies engaging in a production of small lots is considered as a proof of inefficiency to be rationalized.

Dynamic and Innovative Industries

However, if the demand is changing rapidly and the technological innovation progresses rapidly, namely, dynamic innovation of industries, speed in Research and Development (R&D), designing, and prototyping are the keys for the competitiveness, and the manufacturing is characterised by a small lot of production of many products. In such a dynamic and innovative industry, sometimes a big company structure is not the best organization to cope with such changing demands efficiently. Collaboration among small but highly-skilled firms will offer more flexibility and speed of development of new products with much smaller costs. This is why a typical industrial cluster emerges and survives in dynamic and

innovative industries, such as ICTs, fashion, and electronics.

Reference:

Itami, Horuyuki, Shigeru Matsushima, and Takeo Kikkawa (1998), *The Essence of Industrial Clustering*. Published by Yuhikaku, Chiyodaku, Tokyo

Piore, M. J. and C. F. Sabel (1984), *The Second Industrial Divide*, New York, N.Y.: Basic Books.

22-3 How is an industry cluster different from the classic definition of industry sectors?

An industry cluster represents the entire value chain of a broadly-defined industry from suppliers to end products, including supporting services and specialized infrastructure. Clusters are industries that are connected by the flow of goods and services, which is stronger than the flow linking them to the rest of the economy, and by geographic concentration of the related industries.

What is Industrial Cluster Analysis?

Industrial cluster analysis is a tool to better understand our regional economy. The purpose of cluster analysis is to identify those areas of the economy in which a region has comparative advantages and to develop short and long-term strategies for growing the regional economy. Increased regional prosperity is achieved by creating a positive environment to nurture these clusters.

Success of Industrial Clusters

An industrial cluster is considered to have a comparative advantage if the output, productivity and growth of a cluster are high relative to other regions. Local infrastructure and collaborative efforts afford cluster industries other advantages that are a result of their shared geographic location and common goals. While the total number of jobs in comparative-advantage industries in a region may not represent the majority of the region's employment, these industries are the economic engines of the rest of the economy. Workers, inventors, community, institutions such as government and education, and others support the cluster industries and affect a broad range of industry cluster groupings.

22-4 What are the critical dimensions of a regional cluster?

The critical dimensions distinguish different types of clusters.

- Geographic scope: territory of suppliers, customers, support services, institutions?
- Span: global/national/regional/local?
- Density: nos. & economic weight?
- Breadth: horizontally related industries?
- Depth: vertically related industries
- Activity: no. & nature of value-added chain activities?
- Stage of development: embryonic, emerging, developing, mature?
- Innovative Milieu: learning & innovative environment
- Competitive strength: leadership?
- Technologies: generator, adapter, user?
- Innovative Capacity: high or low?
- Ownership Structure: local/foreign; integrated/ divisional/networks?

Geographical scope to include a critical mass of firms

Unless clusters have a sufficient geographical scope to include a critical mass of suppliers, customers, support services, higher education and research organizations and government agencies, and that together their markets have local to global coverage, it is difficult to distinguish different concentrations of firms. In other words, Clusters are not simply about agglomerations but about critical mass with above average capabilities.

Competitive Capability

Critical mass is also defined in terms of the numbers of businesses located in an area and whether their economic weight, measured in terms of contribution to GDP, or skills levels, or R&D, or all of them are higher than other areas. In other words their competitive capability is important. Similarly, the extent to which a value chain and/or a supply chain is represented in the geographical area also determines the value of a cluster.

Stages of Development of a Cluster

Clusters have their own economic life cycles and can be seen to be at different stages of development, from an embryonic concentration of firms with potential to a mature, or even a declining one (see later for cluster related problems). At each stage, however, how the cluster as a whole grows to

provide for learning opportunities for all constituents determines its environment.

Clusters can, therefore, be classified as Leaders or as Technology Generators or indeed as ones with high innovative capacity depending on the stage of their development.

Reference:

Mitra, Jayanta (2004), “ Building Entrepreneurial Regional Clusters: An Overview” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

22-5 Why is the development of regional clusters so important for policy-makers?

Clusters represent a concentration of firms, technologies and knowledge. In the modern economy the fast pace of change in technologies, the knowledge and skills base related to it, and structural changes to the economy, alongside international sourcing of some of these technologies and their related knowledge base, means that it is critical that business and support service organizations learn ways in which degrees of co-operation can be achieved among wealth creators. Clusters allow for such co-operation by allowing for a focus on industries which can link up with each other within a shared physical space of specialized information and knowledge that tends to stick to that area. The nature of the co-operation is often organic in scope and tacit in character.

Higher employment and higher growth are achieved through clustering

Policy-makers find clusters attractive because the close proximity of related firms tends to generate higher levels of employment than other areas. Higher levels of growth are also achieved in clusters of related industries. In the United States, 18 industrial clusters produce 54% of employment, and in Italy, 200 Industrial Districts produce 42% of employment.

SMEs are source of wealth creation

Increasing recognition is being paid to the majority of all businesses in most countries, the small and medium-sized enterprises (SMEs). These SMEs are sources of natural wealth creation (jobs, contribution to GDP, innovations, etc.) in most economies. Most

clusters are made up predominantly of SMEs even when they are being led by a principal large firm, as for example Pilkington Glass in the opto-electronics cluster in St Asaph in North Wales in the UK.

Reference:

Mitra, Jayanta (2004), “ Building Entrepreneurial Regional Clusters: An Overview” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

22-6 What role can institutional support structures play?

We have noted that institutions, including government organizations, educational institutions and support services, play a very important role in the establishment and sustenance of competitive clusters. This level of institutional involvement is found in most clusters. While much attention is drawn to the organic networking structure of Italian firms in their industrial districts, the typical interventionist role (in a facilitative sense) is not often appreciated.

Emilia Romagna Model

Emilia Romagna, in Italy is home to a number of Italy’s clusters, from knitwear, to shoes to packaging machines and ceramics, among others. There are a number of organizations operating under the auspices of the regional development agency, called ERVET. It is interesting to note that these organizations can be put in 2 categories. One grouping concerned with different aspects of the production and value chain process (from quality management through to sub-contracting, technology development and export promotion), while the second has a sectoral emphasis on their activities.

These organizations are concerned with all aspects of the two categories, including training, market trends analysis, the planning and hosting of trade fairs, government lobbying and other activities at both the operational and the sectoral levels, thus attending to the needs of most firms in the different clusters. Their existence also helps to support inter-cluster sharing of knowledge, skills and resources as appropriate, often supported with effective use of information technologies.

Reference:

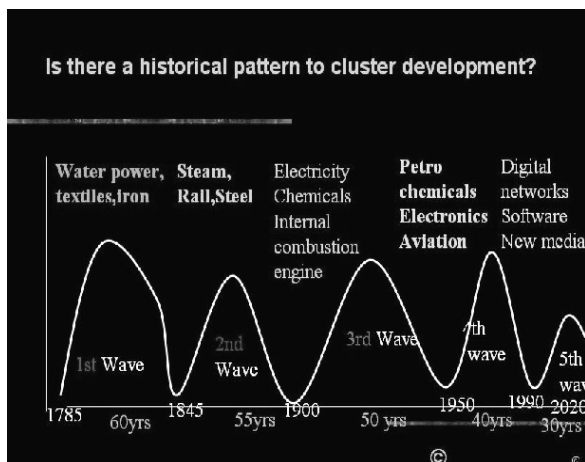
Mitra, Jayanta (2004), “ Building Entrepreneurial Regional Clusters: An Overview” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

22-7 Is there a historical pattern to cluster development?

Historically, we find certain peaks of new technology and innovation-based development and economic growth. This is best explained by the Kondratieff long wave model refined by Schumpeter and subsequently by others.

50-year Cycle of Innovation

This model shows that since the first industrial revolution certain technologies have concentrated to generate innovations and new forms of wealth at particular points in time. A distinct pattern has emerged over time with approximately 50-year cycles, with the time span between cycles reducing with each cycle. The evolutionary character of these technology life cycles suggest that each wave has depended on the previous wave of concentrated technologies and innovations as our knowledge base has widened and deepened.



Cycle has been shortened

The reduction in the time span of the cycles has also led to complexity because of the number of different technologies involved and the convergence between different sets of technologies. This in turn has called for both specialization in key technologies and a sharing of the knowledge base, especially when there is convergence because it is

difficult to acquire a comprehensive understanding of all the different forms of development and their spillover.

Innovation takes place most efficiently in a cluster

The sharing of the knowledge base takes both explicit and tacit forms of learning, and is often best achieved in concentrations of businesses and support organisations in an area.

Reference:

Mitra, Jayanta (2004), “ Building Entrepreneurial Regional Clusters: An Overview” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

22-8 What helps ICT clusters to start and grow?

So far we have referred to clusters in terms of their generic shape and character and also in terms of different models. Most use ICT in one form or another to support their competitiveness and growth. However, as ICT has developed its own industry (both hardware and software) it has also found that the scope and character of ICT allow for a mushrooming of different specializations and their applications, spinning off from and promoting each other. This has led to the creation of many small firms on almost a continuous basis, their rapid progression to large firm status and the constant spinning-off hybrid from those larger constructs. The co-location of these firms is a significant trend as is the nature of the international linkages among the most successful ICT clusters.

Four Separate ICT Clusters

Table 22-1 next page looks at four separate ICT clusters; the Irish model, the Nordic model, the Amsterdam model and the Finnish model. The particular trajectories that each has followed distinguish their character. To a great extent their distinctiveness is a function of their regional characteristics and the efforts made to either harness local strengths or to establish unique credentials through supportive policies. Yet again we find that the clusters evolve over time (with 2 stages to help with the analysis), that specific conditions apply, and that different policies are required to hold together and enhance

economic development. Interestingly, we note that both the development of these clusters and their outcomes are similar in nature, thus suggesting that while the measure of competitive capability may be the same, the processes by which such capabilities are attained vary with each cluster because of the conditions that prevail in different environments.

Reference:
Mitra, Jayanta (2004), “ Building Entrepreneurial Regional Clusters: An Overview” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Table 22-1 Four ICT Cluster Models in Europe

Issues	Irish Growth Model	Nordic Capital Growth Model	International Service City Model (Amsterdam Model)	Peripheral Specialisation Model (Finnish Model)
Driving Force	1. FDI Growth 2. EU Grading and Diversification	1. Telecoms Lead 2. Diversification & Internationalization	1. Local Demand 2. Strong Growth	1. R&D Specialization 2. Strong Growth
Conditions	US Diaspora; EU & US markets; Low wages; English spoken	High costs; Qualified labour; Industry champion; International access; Liberalised telecom market	Inn & cultural image; Strong local demand; Diversified economy; Internet node; International character	Strong local identity; Engineering; Small home market; Liberalised telecom market
Policies	Tax Education Innovation	Deregulation Innovation	None explicit at regional level or for ICT sector	Deregulation; Regional development; National innovation; ICT focused technology strategy
Developments	Rising wages; Talent influx, Growing labour pool; Knowledge diffusion ICT image	As in Irish model + Evolving innovation networks; ICT image	Talent influx; Rising costs/wages, Strong ICT image	University-industry interaction; Strong ICT image; Talent influx
Outcomes	Growth of FDI; New firm creation	New firm creation; Growth of champion, FDI influx	Growth of FDI; Expansion of local firms; Start-ups	Start-ups; Expansion of local firms; Growth of foreign R&D investments

22-9 How does clustering help rural development?

So far our reference points have been essentially urban with some concession to semi-rural environments. But what happens in rural areas where the typical antecedents of cluster establishment are not necessarily available.

Challenges for Rural Areas

Of course there are rich rural areas in Western economies but most rural environments in the South (together with some counterparts in the North) are associated with:

- Disconnectedness(of people and organisations),
- Poor communications infrastructure,

- A salvation route that heads in the direction of the city,
 - Relatively poor levels of information,
 - Low skills levels of people, and poverty.
- We have already seen that successful urban clusters are dependent on certain attractors such as established knowledge and high level skills base to accommodate cluster-type development.

Advantages: Social Capital

However, rural regions are also made up of closely bound communities of people with long traditions in certain types of economic and social activities even if they are relatively disempowered. These traditions offer opportunities for the development of social capital and networks. For this reason institutional involvement becomes critical.

Addressing connectivity

The clustering phenomenon allows us to address some of the deficits in connectivity (both physical and knowledge-based types), the establishment of institutionally supported linkages, capacity building using the existing assets of tradition and social capital, and the use of close communities.

- Connectivity at different levels (markets, knowledge, people)
- Networking and linkages
- Capacity building and critical mass development
- Sharing of information and knowledge spillovers
- Valorising proximity

Reference:

Mitra, Jayanta (2004), “ Building Entrepreneurial Regional Clusters: An Overview” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

22-10 How does clustering and ICT help rural development?

In the previous section we have suggested how clustering can meet certain rural economic needs. Here we examine ways in which clustering and the use of ICT have helped to address the problems rural environments face, and to open up opportunities for new ways of working, the adoption of new technologies and skills, capacity building and the establishment of supportive institutions.

Reference:

Mitra, Jayanta (2004), “ Building Entrepreneurial Regional Clusters: An Overview” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Table 22-2 How does clustering and ICT help rural development?

Rural	Clustering	ICT
undesirable, non-mainstream disconnected, inconsequential (Cisler, 04)	Desirable form of structure for small businesses	ICT platforms enable creation of desirable, connected & significant rural community
Poverty and disempowerment; poor governance	Empowerment through networks and agglomeration of people & businesses	Empowerment through connectivity & information exchange
information and communication deficit, poor levels of connectivity	Information and knowledge spillovers	Addresses information deficit directly through technology & its use by people
Limited levels of networking & links with other territories	Networking allowing for critical mass development	Allows for networking across different interests
Communities of social capital	Based on valorisation of social capital of community	Supports social capital formation
Knowledge pool & path dependency	Success dependent on positive factors of path dependency & local knowledge pool	Realises & makes available knowledge pool
Small businesses with limited capacity	Harnessing collective capacity of small businesses	Provides new tools for small businesses

22-11 Are there good examples of rural clustering including the use of ICT?

Building on the previous tables, Table 22-3 looks at 3 examples from India, the Solomon Islands and Nicaragua. These disparate models call for an appreciation of their differences in terms of size, geography, skills

levels, governance issues, and the knowledge base in particular areas.

Ability to Derive Benefit

The objective here is to analyse the different regions in terms of their ability to derive benefits from clustering, and where appropriate, the use of ICT to deliver those benefits. They are all different models and

comparison between them is not recommended. What we find, however, is the way in which the project has helped to make effective use of social capital, achieve empowerment through learning and different forms of connectivity, and demonstrate the value of their efforts through creating critical mass and possible replication of their efforts across wider territories.

Essential Institutional Support

It was stated earlier that critical mass was crucial to clustering, not simply in terms of numbers of businesses or organizations within a cluster, but also in the way they connect with each other and explore their capabilities for improving their economic activities. Each of the examples offer nuggets of information

which suggest that properly harnessed institutional effort helps to address specific rural issues. What is also of significance, especially in the rural context, is the fact that unless clustering strategies address issues of governance, learning, empowerment and the alleviation of poverty, they will be unable to effect the changes that are sought by policy makers.

Reference:
Mitra, Jayanta (2004), “ Building Entrepreneurial Regional Clusters: An Overview” Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Table 22-3 Good Practice of Rural Clustering

Measures/Indicators of Good Practice	India - PURA	Solomon Islands PF NET	Nicaragua Boaco & Chontales Cluster
Focus of Project	Urban amenities in rural areas	Linking 100s of remote communities, poor governance; high costs	Capacity building among milk & milk production clusters
Developing Social Capital through Grass Roots Access	Education & training institutes for farmers	People first; equitable & sustainable rural development. Affordable access	Institutionalisation of co-operative efforts bet milk & cheese sectors; share tasks & activities
Different Forms of Connectivity Empowerment through Learning	Road, telecom Infrastructure Knowledge education & training institutes Market -best prices for farmers	Financial rural credit + solar power + communications Farmer's networking Disaster management	Establishment of technical norms with Ministries of Environment, Health, Agriculture, Industry; subcontracting with multinational; alliance among co-ops, testing lab for quality assurance.
Replication & Critical Mass	5,000 rural clusters in India over 5 years	E-learning centres in schools, 20 USP (Univ. of South Pacific) students, national steering council	Creation of Nicaraguan Chamber of Milk Sector with Milk Fed. Of Central America & Caribbean

22-12 What are the problems and challenges facing clusters?

Challenges: Globalization of Cluster-Based Activity

The main challenges facing cluster development is the nature and character of globalization. Cluster-based strategies themselves are underpinning economic policy development in many countries around the world. This is in part due to the realization that in the new economy the development of certain new products and processes can take place in different parts of the globe enabling economic progress to take place rapidly in different nations. The advances made by China, India, Malaysia, Brazil, Israel and other countries, however patchy, suggest that this is indeed the case. This form of globalization has also led to both increasing specialization in certain regions and their

dependence on each other. Such specialization can provide for regional cluster development but at the same time these regions need to locate themselves in terms of global imperatives, whether that may be of the market or of the technologies with which they work. Managing this paradox is a critical challenge for policy makers and practitioners.

Global Sourcing of Technologies & Know-how

Similarly, improvements in transportation and communication suggest that the sourcing and supply of products and services can change quickly from one region close by to one further away. This, therefore, puts greater pressure on regions to develop unique capabilities to develop unique products and services. The increasing levels of specialization leads to an unending cycle of dependence across regions as unique products

and services from one region contribute to developments of other unique counterparts elsewhere.

Global Sourcing of Technologies & Know-how Problems: Defining a Cluster

One of the main problems in studying and investigating clusters is its definition. What geographical space are we referring to? Regions as described by policy-makers are not the same as markets recognized by businesses. What constitutes a critical mass in a cluster? How many industries make up a modern cluster? If there are different models how do we develop policy based on good practice? How does it matter whether businesses are within clusters or not as long as they are competitive? Do we have sufficient evidence of close, co-operative relationships among firms in clusters? These are just some of the questions that we need to ask to determine the value of clusters.

Physical Congestion

Some clusters tend to overheat simply by virtue of physical congestion. Such congestion occurs as a result of the success of firms in clusters and the attraction of these clusters for firms from outside to be part of an environment of success. Silicon Valley in the United States and Cambridge in the UK have suffered considerable problems due to an over concentration of firms, and the absence of supportive infrastructure to accommodate the growth of businesses.

Lock-in

One major feature of clusters is its path dependency or its embedded knowledge base developed over years of concentrated economic activity. But just as much a such path dependency helps to generate competitive critical mass so can it lead to problems associated with a certain, time-honoured way of doing things and the lack of any interest to change. This is called lock-in behaviour which can lead to serious difficulties for firms in a highly competitive economic environment.

Evolutionary Policy Development

Finally, evolutionary policy development is slow in delivery and outcomes, and this could cause problems in terms of possible mismatches between technological advancement and the need to develop policy that is not only reactive but is able to work

with the changes that take place in the wider economy.

Reference:

Mitra, Jayanta (2004), " Building Entrepreneurial Regional Clusters: An Overview" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

22-13 What key lessons for policy development can we learn from our overview of cluster development?

Our consideration of cluster development has some important lessons for policy development. While we may note that cluster-based policy development can help to achieve competitive strength in different economies, planning for such outcomes is not easy.

Evolutionary in Character: Stages of Development and Critical Mass Outcome

Firstly, clusters are evolutionary in character; they take time to evolve, and until such time as there is a critical mass of organizations sufficiently networked and linked with each other to generate positive economic outcomes, we cannot claim that cluster policies work.

Spatial Agglomeration of Businesses and Related Organizations: Physical Concentration of Firms and Their Relationships

Secondly, spatial concentrations of businesses are by themselves not enough to recommend cluster-based policy development. The presence of facilitative institutions, both public and private, is central to the emergence of successful clusters. This means that institutional capacity building which takes on novel approaches to regional policy making become crucial. Such an approach is different from simply laying on the pile of money, training, inward investment and education provision. It means being selective in the sense of working at relationships based on common and related business sectors, technologies and skills.

Different Models for Different Environments

We have also noted that different environments spawn different clusters. This is because the value of path dependency emerges

from specific attributes, sometimes taking the form of physical resources and sometimes, in the form of information and knowledge centred round a set of skills and technologies.

Different Forms of Connectivity Achieved

Clusters help to achieve different forms of connectivity at the level of relationships between people, local, regional and international markets for businesses, sharing of ideas based on different knowledge bases and their spillovers, and the tendency of convergence of different technologies for new product and process development resulting in innovation. ICT can help considerably in making such connectivity substantial through ease and speed of access and use. Equally, and especially in rural areas, it can transform people's lives through empowerment and better forms of governance.

Learning, Path Dependency, Externalities, Paradox of Localization and Internationalization, Innovation

The underlying message is that what supports evolutionary development and connectivity is the way people and institutions learn and use path dependency factors positively to avoid Lock-in. This also helps to manage the apparent paradox of creating local networks of knowledge and industry operating in global environments. Most successful clusters are both strongly local in their shape and structure, and yet most businesses in those clusters operate in international markets, outsourcing, trading, drawing on R&D and skills worldwide. For policy-makers this is of critical importance as they try to support their local economies using a global knowledge base.

Reference:

Mitra, Jayanta (2004), " Building Entrepreneurial Regional Clusters: An Overview" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Chapter 23 Role of the Government

Clusters usually emerge spontaneously. Government's role is to create liberal regulatory environment. But in some countries, more active role prove to be useful, such as financial and tax incentives, creating science parks and linkage with research institutions. What are the appropriate government roles?

Curriculum Topics:

- 23-1** Why is the development of regional clusters so important for policy-makers?
23-2 How has the interest in clusters been shaped?
23-3 How does government policy support regional cluster development?

23-1 Why is the development of regional clusters so important for policy-makers?

Clusters represent a concentration of firms, technologies and knowledge. In the modern economy the fast pace of change in technologies, the knowledge and skills base related to it, and structural changes to the economy, alongside international sourcing of some of these technologies and their related knowledge base, means that it is critical that business and support service organizations learn ways in which degrees of co-operation can be achieved among wealth creators. Clusters allow for such co-operation by allowing for a focus on industries which can link up with each other within a shared physical space of specialized information and knowledge that tends to stick to that area. The nature of the co-operation is often organic in scope and tacit in character.

Higher employment and higher growth are achieved through clustering

Policy-makers find clusters attractive because the close proximity of related firms tends to generate higher levels of employment than other areas. Higher levels of growth are also achieved in clusters of related industries. In the United States, 18 industrial clusters produce 54% of employment, and in Italy, 200 Industrial Districts produce 42% of employment.

SMEs are source of wealth creation

Increasing recognition is being paid to the majority of all businesses in most countries --- the small and medium-sized enterprises (SMEs). These SMEs are the sources of natural wealth creation (jobs, contribution to GDP, innovations, etc.) in most economies. Most clusters are made up predominantly of SMEs even when they are being led by a principal large firm, as for example Pilkington Glass in the opto-electronics cluster in St. Asaph in North Wales in the UK.

Reference:

Mitra, Jayanta (2004), "Building Entrepreneurial Regional Clusters: An Overview" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

23-2 How has the interest in clusters been shaped?

Historically the interest in clusters has been shaped on the one hand by the need to advance local or regional social and economic development and on the other by the perception that small enterprises, and density of interaction among them, give firms flexibility, technology diffusion, and market competitiveness. Governments have set policies to enhance these processes.

Much of this policy initiative has turned on how existing knowledge infrastructures might be expanded by enriching knowledge linkages

where the informal, tacit knowledge in the transfer of information is deepened through geographic proximity and the creation of centres of excellence.

Overtime, new industry policy architecture moved away from direct government intervention to initiatives built around collaborative alliances between enterprises and private and public organizations.

Clusters are definably one of the several strategies now long employed in a state national innovation system along with others, from science and technology (S&T) parks, business and incubator centres, and networks through to micro programs such as tax based incentives. All but the latter focuses on the building of spatial concentration of enterprises and forms of networks.

Differences of Clusters and Networks

The OECD usefully sets out the differences as follow:

- (1) Networks can provide firms with access to specialized service at lower costs, while clusters attract needed specialised services to a region.
- (2) Networks have restricted membership, while clusters have an open membership.
- (3) Networks are based on contractual agreements. This contrasts with clusters, which are often based on shared social values that encourage reciprocity.
- (4) Networks make it easier for firms to engage in complex production, while clusters generate demand for more firms with similar and related capabilities.
- (5) Networks are based on co-operation, while clusters often involve both co-operation and competition.

The idea of community is here captured in the notion 'shared social values' comparability of industry type and linkages both vertically and horizontally, so characteristic of a cluster.

Reference:

Innovation Lab Australia (2002), "Innovation Lab Australia as an ICT Cluster" ILA-02-005 Friday, April 26, 2002. Australia <http://www.innovationlab.com.au/reports/ILA02005.pdf>

23-3 How does government policy support regional cluster development?

It is difficult to find a pattern to public policies for cluster development. This is mainly because clusters take various forms. As stated earlier, clusters could be centred aqround a single industry or a set of related industries. They could also be operating at different stages. Moreover policy level intervention has to address market failures and to create appropriate conditions for economic growth.

Financing the Co-operation between Firms and Advice and Counselling

Thus policy level interventions have taken various forms. According to the European Network for Social and Economic Research (ENSR) Cluster Survey (2001), some governments have chosen to facilitate activities at the level of the firm, by financing projects which seek co-operation between firms and/or provide advice and counselling to managers and employees.

Attracting Anchor Firm through Targeted Investment Policy

Some governments have sought to support clusters by trying to attract large anchor firms through carefully targeted inward investment strategies in the hope that this will help local suppliers to emerge and grow.

Support Service Infrastructure

Other governments have adopted an arms-length approach by focusing attention on the support services only, thus ensuring that firms have access to a good and facilitative 'hard' and 'soft' infrastructure.

Provide Information on Technologies and Market, and Training

Providing information on key technologies, markets and supporting generic training, research and related activities within institutions in clusters, has distinguished some governmental policies.

Facilitation of Networking

Further business-oriented support has led to the facilitation of networking and collaborative programmes.

All of these measures constitute legitimate forms of intervention. Their value and efficacy are dependent on the cluster in question.

Reference:

Mitra, Jayanta (2004), "Building Entrepreneurial Regional Clusters: An Overview" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Rouach, Daniel (2004a), "Creating ICT Clusters of Innovative Small Businesses" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Chapter 24 University as an Innovation Center

In almost all ICT clusters, universities and research institutes play as the core of the cluster. Providing technological seeds, entrepreneur team and incubation are the major roles. How best universities can create such positive functions?

Curriculum Topics:

- 24-1 Have innovation and entrepreneurship been central to idea of university?
- 24-2 What kinds of ICT education are needed?
- 24-3 How does ICT impact on generation and delivery of educational contents?
- 24-4 What can be done to promote ICT-based innovation and entrepreneurship?

24-1 Have innovation and entrepreneurship been central to idea of university?

When we examine historical evaluation, it is found that it's not really. Central to the idea of University was the "pursuit of knowledge," whether it is useful to the real life or not. There was little linkage of university education to the innovation and entrepreneurship.

Second objective of the traditional university was to train the people through transmission of skills. This tradition was inherited from the style of "Guild" and train people with skills which were rather static and did not encourage innovations and entrepreneurship.

Therefore, university's genesis was not so much to produce innovations but it is the locus for:

- Education of the students in a academic disciplines, and
- Research on basic academic development, which may sometimes be related to innovation but often there were no specific focus on effective pursuit of innovations.

Now let us look at the case of universities in Latin America & Caribbean region with regards to innovation and entrepreneurship:

- (1) Until recently, University was stronghold of ruling classes and the major role of the universities are to give education to the students coming from the elite class and

provide a certificates for them to live a better career opportunities.

- (2) Classical professions, therefore, are the Medicine, Law, Engineering. At that time, ideal elite families were the ones which had a doctor, a lawyer and an engineer in their family.
- (3) From 1960's, strong ideological discourse sets in the Latin American Universities, which aimed to improve the political system. But this movement was nothing related to the reform of universities towards more innovation and entrepreneurship.
- (4) Research activities had been quite limited and graduate students abroad were very important source of new knowledge until 1980's/90's when Latin American universities tried to establish their own Ph.D courses. However, this kind of cross-cultural interactions was very important for many of the developing countries, and actually many revolutionary leaders were educated in other developed countries.

In all countries, universities were the first organization to realize the huge impact of the ICT from the start. ICT impact on innovation and entrepreneurship at universities could be described as follows:

- (1) Computing power brought about the revolutionary changes in the university research and administration.

- (2) Internet Network among Academic Institutions was first created by the universities and still run by universities.
- (3) Organizational paradigm of the universities has changed due to the ICT revolution. In Japan, the universities which created the Internet system were not the national universities, but two of the private universities: Keio and Waseda.

Reference:

Takahashi, Tadao (2004), "Universities as Centers for Innovation and Entrepreneurship: Some Ideas on ICT-Based Actions"
Presentation for the International Seminar on ICT Policy Reform and Rural Infrastructure

24-2 What kinds of ICT education are needed?

In fact all types of education are needed. But in order to develop ICT, a balanced development of all levels of education is necessary.

- Primary education, including computer and Internet literacy education from an early stage
- Technical education to produce a software engineers, networking engineers and all sort of programmers and technicians
- Undergraduate Education to produce higher-level engineers, users for software applications in many private and public organizations
- R&D activities to produce the most innovative and sophisticated applications of ICT

In all areas, the education programs should aim to create a broad spectrum of people with different levels of understanding and commitment: from "Literacy" to "Fluency" and then to "Professional" levels. Major challenges are not within ICT-areas, but in the adoption of ICT in other areas.

What kinds of innovation will be needed?

Two major "types" of innovation universities should produce: technical and organizational.

- (1) Technical Innovation:
 - Deriving from R&D
 - Includes proof of concept results (ex.: Digital Inclusion recipes)
- (2) Organizational:

- Deriving from changes in Social Systems (ex. Project Structures WWI, Networks of Institutions Learning Organizations, etc.)

NB - Digital Inclusion is perhaps more in need of Organizational Innovations today.

Finally, what kinds of entrepreneurship are needed?

- Classical Entrepreneurship is needed
- Government Intra-preneurship
- Social Entrepreneurship (Scaling-up from proofs-of-concept, self-sustaining, self-replicating, changing original status quo, planning for long-range scenario)

Reference:

Takahashi, Tadao (2004), "Universities as Centers for Innovation and Entrepreneurship: Some Ideas on ICT-Based Actions"
Presentation for the International Seminar on ICT Policy Reform and Rural Infrastructure

24-3 How does ICT impact on generation and delivery of educational contents?

World quality is necessary in the following consideration: (i) complex structuring; (ii) basics vs. details; and (3) universal vs. local, etc. Delivery mechanism of ICT education must contemplate the following issues: (i) asynchronous mode, and (ii) user-driver.

Curricula for ICT education must conciliate the emphasis on basic skills, with "Hands-on" approach to specific training.

However, we also observe a few challenges in legal aspects that are:

- Distance learning courses need to be supported as fully accredited activities
- Cross-accreditation of academic work between institutions in different countries
- Complex framework necessary to allow universities to operate as incubators of innovative initiative

Reference:

Takahashi, Tadao (2004), "Universities as Centers for Innovation and Entrepreneurship: Some Ideas on ICT-Based Actions"
Presentation for the International Seminar on ICT Policy Reform and Rural Infrastructure

24-4 What can be done to promote ICT-based innovation and entrepreneurship?

First, we need to look at universities as central actors in promotion of innovative initiatives with private companies and government. Second, we need to promote the structuring of local networks (SMEs, Cities, etc.) and their participation in global initiatives.

Then thirdly, we should promote some global projects where concrete execution can be highly distributed:

- Open technologies/documentation (E-government applications, Backbone devices, etc.)
- Horizontal R&D Initiatives (E-Business, Genom Research, etc.)
- Fellowship Program for Future ICT
- Champions

Now, the question is how we should organize various efforts in Latin America and the Caribbean region:

- A virtual organization articulating activities of a network of some 6-10 university-based R&D group;
- Funding from private companies operating in the region (and International Agencies);
- Partnership with governments for specific projects/goals;
- Main focus of interest: Scaling-up proof-of-concept results as the bootstrapping phase of purely private initiatives, purely governmental projects, and/or public/private efforts; and
- Cooperation with global initiatives will be actively sought (GeSCI, ITAFE, NetGrowth, etc.)

Reference:

Takahashi, Tadao (2004), "Universities as Centers for Innovation and Entrepreneurship: Some Ideas on ICT-Based Actions"
Presentation for the International Seminar on ICT Policy Reform and Rural Infrastructure

Chapter 25 Supporting Entrepreneurs

Habitat is an economic, social and cultural environment of a region which is conducive for entrepreneurship. It includes liberal investment climate, economic and institutional infrastructure to support entrepreneurs, and comfortable and stimulating living environment. How to create such Habitat?

Curriculum Topics:

- 25-1 What is the role of human networks and social capital in developing a cluster?
- 25-2 What is the economic, cultural environment to support the growth of ventures?
- 25-3 What kind of infrastructure is necessary to support entrepreneurs?

25-1 What is the role of human networks and social capital in developing a Cluster?

Porter (1998) highlights effective information flow as central to the success of an industrial cluster. He also suggests that the proximity of companies and institutions in one location and the repeated exchanges among them fosters better coordination and trust. A key factor underlying the operation of industry clusters therefore is an effective network of relationships that simulates the creation of new ideas, innovation and entrepreneurship. Even though Porter's theory may not explain the role of individual entrepreneurs in a cluster, it is his observations in this area that are most relevant to the present research.

Relational Social Capital was important in forming the Cambridge Cluster

In "The Cambridge Phenomenon" (1985), Segal Quince Wicksteed developed a complex family tree of start-ups and spinouts which provided evidence that directly or indirectly, the ultimate origin of the high-technology companies is the University. However, their unit of analysis was at the level of the firm, whereas this paper establishes the linkages at the level of the individuals to illustrate the dynamics of structural and relational social capital within parts of the Cambridge cluster.

A mini-cluster of key individuals

At the centre of these networks move a mini-cluster of key individuals (investors,

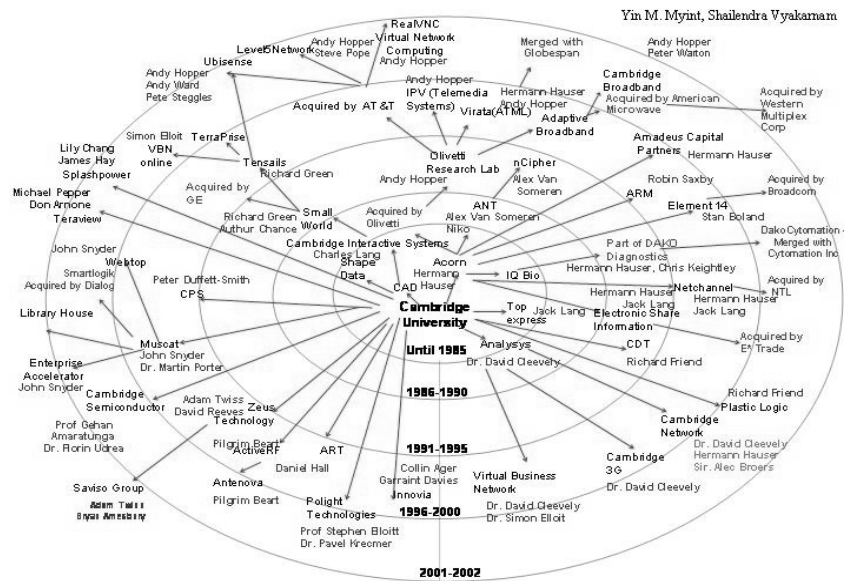
academics and serial entrepreneurs) who are believed to have an important influence on the success of the cluster. Their continuous involvement in supporting entrepreneurial businesses is a constant feature for the prosperity of Cambridge high technology industry.

Spin-outs of Acorn and are among Cambridge's biggest success stories

Figure traces the formation of the hi-tech cluster from the early stages when start-ups of the University such as the Computer Aided Design (CAD) Centre and companies such as Acorn Computers and Topexpress emerged in the late 1970s and 1980s. With the convergence of information and communication technologies, the IT-based cluster in Cambridge now has a number of telecommunication and Web-based companies and continues to grow with new successful players such as ARM and Virata (now Conexant Systems) both of which are spin-outs of Acorn and have become among Cambridge's biggest success stories.

The links between individuals with prior associations indicate the movement of people from Acorn Computer from the late 1970s until recently to a number of different hi-tech start-ups, still communicating with each other, working together repeatedly in various organisations – building a high level of relational social capital. Although Acorn no longer exists, those people previously associated with Acorn are still active in various organizations in Cambridge.

Figure 25-1 Evolution of the Cambridge Cluster



Vyakarnam & Myint (2004)

Cambridge Consultants Ltd (CCL) gave birth to the consultancies

Figure 25-1 maps the formation of major technology consulting firms: Cambridge Consultants Ltd (CCL -itself the offspring of the University in 1960) which gave birth to the Generics Group, PA Technology and The Technology Partnership. These consultancies represent a distinctive element of the cluster and have continued to prosper and are evolving into more rounded technology houses. They have established their own venture capital firms, and invested in a number of start-ups including their own spin-outs.

Network of Individuals created firms and made investments

The Cambridge sample of companies has 59 individuals including entrepreneurs, VCs, business angels, and other professionals associated with two or more companies.

There are a few individuals identified by the study---Hermann Hauser and Bob Pettigrew---who form links between the two sectors as they have invested in bio-tech companies. Both figures illustrate the complexity of the social structure within the Cambridge cluster and this is only a simple illustration. Each individual on the chart could be connected to the other directors in their Cambridge companies, and also to boards of companies

outside the sample or in other locations. Similarly, there are other formal groups to which these individuals may belong for business purposes, such as business angel groups and industry committees.

Now that we have completed this first study, somewhat like removing the surface in an archaeological study, we are discovering a much more detailed understanding by finding the “Invisible lines” not normally available in public data.

Reference:
 Vyakarnam, Shailendra, & Y. Myint. (2004) “University as the Centre for Innovation and Entrepreneurship” University of Cambridge, Centre for Entrepreneurial Learning.
 Porter, Michael E. (1998), *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, Free Press, June 1998

25-2 What is the economic, cultural environment to support the growth of ventures?

In order to create the climate for enterprise, policy-makers and Heads of Institutions, Businesses and Support organisations need to work on several fronts simultaneously. In

addition these actions need to be taken in some coherent and cohesive way, so that the very people we are trying to support are not confused by what we have on offer for them.

Models for Venture Growth

In this model we see that Venture growth is dependent on the creation and development of infrastructure, human resource development, and social environment.



(1) Infrastructure

Infrastructure to support the venture growth includes:

- Funding for the start-up enterprises, such as venture capitals, Angels, and commercial banks,
- Legal support and quality enhancement, such as law firms, and management consultancy forms,
- Mechanism to ensure transparency of business transactions, such as sound regulatory framework, procurement procedures, accounting rules and professions,
- Technology transfer organizations, and
- Physical facilities, such as incubators and science parks

(2) Social Environment

Alongside this we need to think about making “entrepreneurship” acceptable in cultural terms. This is where the signalling effect of successful entrepreneurs, Heads of Institutions and a supporting education programme fit together.

- Entrepreneurship: Attitudes of academics, risk orientation, role models and signalling effects,
- Aligning Goals: Personal, team and business

(3) Human Development

Finally, no ideas can get to market without the commitment of people and a strong education, mentoring and support network is essential.

- Resources within the team: Complementary skills,
- Building human capital: Knowledge, and Ability to sell, and
- Building social capital: Networks of contacts, social skills, and make a pitch.

Reference:

Vyakarnam, Shailendra, & Y. Mynt. “University as the Centre for Innovation and Entrepreneurship” University of Cambridge, Centre for Entrepreneurial Learning

25-3 What kind of infrastructure is necessary to support entrepreneurs?

In order to better understand the role of formal mechanisms and instruments in stimulating local development of technology clusters, we will need to briefly review some of the history of the development of Cambridge.

Accommodation for Start-up Firms:

Incubators

Starting-up firms needs physical space to accommodate their business activities. Incubators and science parks are created to satisfy such needs with relatively flexible terms; size and duration of occupancy. In addition, these facilities offer various business advisory services, common office services, business plan development, and mentoring and networking.

Providing Synergies for Research Activities: Science Parks



Research activities require intensive exchange of information and knowledge. Science parks are created to support research-intensive firms to locate their offices close to each other to benefit from synergies and usage of shared laboratory facilities. Science parks are often created in association with core universities or research institutions.

Technology Transfer Organizations

Universities and research institutions have created organizations to facilitate entrepreneurs to use their technologies to make commercial activities.

Venture Capital Funds and Angels

Venture capital funds are equity funds specialized in start-up enterprises. They attract funds from other investors and make investment in the equity of start-up businesses and often involve deeply in the management of the investee companies.

Angels are high-wealth individual, often experienced entrepreneurs themselves, who invest in start-up enterprises. They are also providing mentoring to the young entrepreneurs.

Networking Organizations for Entrepreneurs

Entrepreneurs need many types of institutions in order to start up their businesses. They need an organization which assists them to create a network with other entrepreneurs, venture capitals and Angels, mentors and potential business partners.

Reference:

Vyakarnam, Shailendra, & Y. Mynt. "University as the Centre for Innovation and Entrepreneurship" University of Cambridge, Centre for Entrepreneurial Learning

Rouach, Daniel. (2004b), "ICT Cluster in Israel" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Wang, Kung. (2004), "Developing High-Tech Industry through Establishing ICT Cluster – Case of Taiwan" Presentation for the International Seminar on ICT Policy Reform and Rural Communication Infrastructure

Donors' Support to ICT Development

The presentations listed below are the ones not much mentioned in the report but are still useful for further understanding the report. They are available at the JICA web-sites on *the International Seminar on ICT Policy Reform and Rural Communication Infrastructure* (<http://www.jica.go.jp/english/event/index.html>).

Donor Name	List of Presentations
EBRD	- David Cooper, "EBRD Financing for Rural Communication Infrastructure"
JBIC	- Junichi Yamada, "JBIC's Contribution to IT Sector: Focusing on ODA Loans"
JICA	- Kenji Tobita, "Overview on the ICT Development Assistance by JICA" - Yoshio Niizeki, "Information to Knowledge – Knowledge Creation and JICA's ICT Support" - Masatoshi Akagawa, "JICA's Experience in Telecentre Development – Regional Internet Centers in Malaysia" - Takuzo Fujii, "Rural Communications Engineering Course and E-Learning Tool"
IFAD/IDRC	- Roxanna Samii, "Creating Farmer's Information through Rural Connectivity" - Shalini Kala, "ENRAP: Strengthening Knowledge Networks for the Poor"
ADB	- Lee Jeoung-Keun, "ADB's Experience in Telecenters"
The World Bank	- Nagy Hanna, "World Bank's E-Development Strategy"

Useful Web Sites

The following is the list of web sites that were referred to in *the International Seminar on ICT Policy Reform and Rural Communication Infrastructure*.

Organizations / Networks	Category	URL
Asian Development Bank (ADB)	Donor	http://www.adb.org/
Asian Development Bank Institute (ADBI)	Research	http://www.adbi.org/
BRAC University (Bangladesh)	Cluster	http://www.bracuniversity.ac.bd/
Datamation, India	Rural Connectivity	http://www.datamationfoundation.org/
Digital Vision Program at Stanford University (USA)	Research Scholarship	http://rdvp.org/
European Bank for Reconstruction and Development (EBRD)	Donor	http://www.ebrd.com/
European School of Management	Cluster	http://www.escp-eap.net/
Electronic Journal of Information Systems in Developing Countries	Research	http://www.ejisdc.org/
ENRAP-Knowledge Networking for Rural Development in Asia/Pacific Region	Rural Connectivity	http://www.enrap.org/
Grameen Phone (Bangladesh)	Rural Connectivity	http://www.grameenphone.com/
IDRC	Research	http://www.idrc.ca/
IFAD	Donor	http://www.ifad.org/
Indian Institute of Technology, Madras (India)	Rural Connectivity	http://www.iitm.ac.in/
Intelecon (Canada)	Policy Reform	http://www.inteleconresearch.com/
ITU Association of Japan, Inc.	Training	http://www.ituaj.jp/english/index.html
JBIC - Japan Bank for International Cooperation	Donor	http://www.jbic.go.jp
Judge Institute of Management, University of Cambridge (UK)	Cluster	http://www.jims.cam.ac.uk/
Kanagawa Science Park (Japan)	Cluster	http://www.ksp.or.jp/english/index.html
Learning Information Networking Knowledge (LINK) Center (South Africa)	Policy Reform	http://link.wits.ac.za/
Makerere University (Uganda)	Policy Reform	http://www.ituaj.jp/english/index.html
McCarthy Tetrault LLP (Canada)	Policy Reform	http://www.mccarthy.ca/
MIT Media Laboratory (USA)	Rural Connectivity	http://www.media.mit.edu/
Research ICT Africa	Policy Reform	http://www.researchictafrica.net/
Scanbi Invest (Sweden)	Rural Connectivity	http://www.scanbi-invest.com/
World Bank	Donor	http://www.worldbank.org/
World Summit on the Information Society (WSIS)	Conference	http://www.itu.int/wsif/
Yokosuka Research Park (Japan)	Cluster	http://www.yrp.co.jp/en/index.htm