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30 June 2010

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AgInfo

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Lack of policy prevents mobile banking model from clicking

Economic Times, Ahmedabad

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Dr. Harsha de Silva picked for Eisenhower Fellowship The Island Print India http://www.island.lk/2009/07/26/news11.html	25-Jul-09
Domestic freight, post-war regions not given enough attention The Island Print India http://www.island.lk/2009/07/25/business2.html	24-Jul-09
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Discussing power conservation measures in AC comfort The Sunday Times Print India http://www.sundaytimes.lk/090524/FinancialTimes/ft328.html	13-Mar-09
Sri Lanka fixed access telco starts free outgoing packages Lanka Business Online Web n/a http://www.lankabusinessonline.com/fullstory.php?nid=35897352	13-Feb-09
Bangladesh: International Telecom Policy Global Voices Web n/a http://globalvoicesonline.org/2009/02/13/bangladesh-international-telecom-policy/	11-Feb-09
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Prudent trade and policy strategies with India will benefit Sri Lanka The Island Print India http://www.island.lk/2009/01/15/business1.html	05-Jan-09

DIRSI researcher, Antonio Botelho, attended the Teleuse@BOP3 analysis workshop and the CPRsouth3	
DIRSI	
Web	
n/a	
http://www.dirsi.net/english/index.php?option=com_content&task=view&id=162&Itemid=46	31-Aug-08
Is Green Tax only adding to public woes?	
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Web	
n/a	
http://www.groundviews.org/2008/07/16/mobile-phones-in-sri-lanka-everymans-new-trousers/	

Events, April 2008 – June 2010

AgInfo

- Meeting with IDRC Board of Governors, *organized by the IDRC*, 22 January 2009, Kalutara, Sri Lanka
- Conference on Protecting the Poor in Sri Lanka in Crisis and Beyond, *organized by the Institute of Policy Studies and the World Bank*, 24 June 2009, Colombo, Sri Lanka
- Joint National Conference on Information Technology in Agriculture, *organized by the IT Department of the University of Moratuwa and the Agriculture Department of the University of Ruhuna*, 16 July 2009, Moratuwa, Sri Lanka
- The 27th International Conference of Agricultural Economists, *organized by the International Association of Agricultural Economists*, 16 - 22 August 2009, Beijing, China
- CPRsouth4, *organized by CPRsouth secretariat and LIRNEasia*, 5 - 8 December 2009, Negombo, Sri Lanka
- LIRNEasia@5: Research --> Policy --> Knowledge-based economies, *organized by LIRNEasia*, 9 - 11 December 2009, Colombo, Sri Lanka

CPRsouth

- Meeting with IDRC Board of Governors, *organized by the IDRC*, 22 January 2009, Kalutara, Sri Lanka
- Development of Evaluation Capacity in ICT4D (DECI) meeting, *organized by IDRC*, 11 June 2009, Penang, Malaysia

Indicators, continued

- Workshop on Broadband Quality of Service (QoS) testing , *organized by LIRNEasia* , 25 November 2008, Sarvodaya headquarters, Moratuwa, Sri Lanka
- TRE 2008 Dissemination event - the Philippines, *organized in association with the University of the Philippines*, 03 February 2009, Manila, the Philippines
- TRE 2008 Dissemination event - India, *organized in association with Voice & Data, India*, 06 March 2009, Delhi, India
- SA Connect Public Seminar Series, *organized by the Graduate School of Business, University of Cape Town, South Africa.*, 14 April 2009, Cape Town, South Africa
- Connectivity and Convergence: Alternative Regulatory Strategies for Telecommunications, *organized by LIRNE.NET in collaboration with the Graduate School of Business at the University of Cape Town*, 14 - 17 April 2009, Cape Town, South Africa
- Public Seminar: Broadband Quality of Service Experience (QoSE), *organized by LIRNEasia in association with the Institution of Engineers, Sri Lanka*, 29 April 2009, Colombo, Sri Lanka
- Workshop on Mobile Broadband Quality of Service Experience (QoSE) measuring approaches, *organized by LIRNEasia*, 30 April 2009, Colombo, Sri Lanka
- IDRC PAN-All conference, *organized by the IDRC*, 12 - 14 June 2009, Penang, Malaysia
- Workshop: Policy Coherence in the Application of Information and Communication Technologies for Development, *organized by the OECD and infoDev/World Bank*, 10 - 11 September 2009, Paris, France
- Experts Workshop: "Beyond Broadband Access: Data-based information policy for a new administration", *organized by the Institute for Information Policy, Pennsylvania State University, Quello Center for Telecommunication Management and Law, Michigan State University, School of Communication, Information and Library Science, Rutgers University*, 22 - 24 September 2009, Virginia, USA
- Asian Telecom Seminar, *organized by the Symbiosis Institute of Telecom Management*, 25 - 26 September 2009, Pune, India
- Training workshop on communicating for influence on policy for researchers, *organized by the "DREAM IT" Mega Mongolia Project*, 16-17 October 2009, Mongolia
- Telecom Regulatory Environment (TRE) Dissemination event, *organized by LIRNEasia in association with the Thai Media Policy Center, Chulalongkorn University and Siam Intelligence Unit, Thailand*, 19 October 2009, Bangkok, Thailand
- Training workshop on "Measuring ICT Access and Use by Households and Individuals, *organized by ITU and LIRNEasia and hosted by the Ministry of Information and Communication Technology (MICT), Thailand*, 19 - 23 October 2009, Bangkok, Thailand
- Broadband QoSE Dissemination event, *organized by LIRNEasia in association with IIT-Madras*, 03 November 2009, Chennai, India

- OECD workshop on "Expanding access to the Internet and broadband for development", *organized by the OECD*, 16 November 2009, Sharm el Sheikh, Egypt
- CPRsouth4, *organized by CPRsouth secretariat and LIRNEasia*, 5 - 8 December 2009, Negombo, Sri Lanka
- LIRNEasia@5: Research --> Policy --> Knowledge-based economies, *organized by LIRNEasia*, 9 - 11 December 2009, Colombo, Sri Lanka
- "How broad is your broadband?" Workshop, *organized by LIRNEasia*, 13 February 2010, Colombo, Sri Lanka
- ICTs and development: an international workshop for theory, practice and policy, *organized by the Indian Institute of Technology, Delhi*, 11 - 12 March 2010, New Delhi, India
- 18th Convergence India, *organized by Exhibitions India Group*, 23 - 25 March 2010, New Delhi, India
- CPRAfrica Young Scholar tutorials, *organized by Research ICT Africa*, 18 - 19 April 2010, Cape Town, South Africa
- Training Seminar on New Technologies and their Challenges for Telecommunications Regulation in Latin America, *organized by DIRSI and ACORN-REDECOM (Americas Communication Research Network / Red Americana de Investigación en Información y Comunicación)*, 13 May 2010, Brasília, Brazil
- LIRNEasia Dissemination event and Tutorials, Singapore, *organized by LIRNEasia and the Communication and New Media*, National University of Singapore, 21 - 22 June 2010, Singapore

Mobile 2.0

- International Conference on Information and Communication Technologies and Development (ICTD), *organized by CMU/TechBridgeWorld*, 17 - 19 April 2009, Doha, Qatar
- "Mobile 2.0: Beyond Voice?" Pre-conference of the International Communication Association (ICA), *organized by LIRNEasia in association with ICA*, 20 - 21 May 2009, Chicago, USA
- Release of Report on Cell Broadcasting for Early Disaster Warning in Maldives, *organized by LIRNEasia in association with the Communications Authority of the Maldives*, 15 July 2009, Male, Maldives
- Workshop: Policy Coherence in the Application of Information and Communication Technologies for Development, *organized by the OECD and infoDev/World Bank*, 10 - 11 September 2009, Paris, France
- Mobile communication and social policy, *organized by Rutgers University, New Jersey, USA*, 9 - 11 October 2009, New Jersey, USA
- Telecom Regulatory Environment (TRE) Dissemination event, *organized by LIRNEasia in association with the Thai Media Policy Center, Chulalongkorn University and Siam Intelligence Unit, Thailand*, 19 October 2009, Bangkok, Thailand
- Mobile 2.0 "eGovernment" study Dissemination event, *organized by LIRNEasia*, 05 November 2009, New Delhi, India
- Second India Disaster Management Congress, *organized by the National Institute of Disaster Management (NIDM)*, 4 - 6 November 2009, New Delhi, India
- OECD workshop on "Expanding access to the Internet and broadband for development", *organized by the OECD*, 16 November 2009, Sharm el Sheikh, Egypt
- Civil Protection Forum "Towards a more resilient society", *Organized by the European Commission*, 25 - 26 November 2009, Brussels, Belgium
- eAsia, *Organized by the Centre for Science, Development and Media Studies (CSDMS), India and Information and Communication Technology Agency (ICTA)*, 2- 4 December 2009, Colombo, Sri Lanka
- CPRsouth4, *organized by CPRsouth secretariat and LIRNEasia*, 5 - 8 December 2009, Negombo, Sri Lanka
- LIRNEasia@5: Research --> Policy --> Knowledge-based economies, *organized by LIRNEasia*, 9 - 11 December 2009, Colombo, Sri Lanka
- Lecture on Data Mining and Applications , *Organized by the Univesity of Peradeniya*, 21 December 2009, Peradeniya, Sri Lanka
- Dissemination of Mobile 2.0 study: India, *Organized by LIRNEasia*, 4 - 5 March 2010, New Delhi, India
- ICTs and development: an international workshop for theory, practice and policy, *organized by the Indian Institute of Technology, Delhi*, 11 - 12 March 2010, New Delhi, India
- 2010 International Symposium on Medical Informatics and Communications Technology, *organized by the ISMICT secretariat*, 22 - 25 March 2010, Taipei, Taiwan
- Dissemination of Mobile 2.0 study: Bangladesh, *Organized by LIRNEasia*, 28 March 2010, Dhaka, Bangladesh
- Dissemination of Mobile 2.0 study: Thailand, *Organized by LIRNEasia*, 30 March 2010, Bangkok, Thailand
- "Reaching the 'Last-Mile': Early Warning Dissemination Lessons from the Indian Ocean", *Geoscience Australia, Organized by the Geoscience Secretariat*, 06 April 2010, Canberra, Australia
- Early Career Researcher Workshop, Australian Climate Change Adaptation Research Network for Settlements and Infrastructure (ACCARNI) , *Organized by Australian Climate Change Adaptation Research Network for Settlements and Infrastructure*, 16-19 April 2010, Gold Coast, Australia

- CPRAfrica, organized by Research ICT Africa, 19 - 21 April 2010, Cape Town, South Africa
- Expert Forum Meeting on 'Mobile 2.0 Applications and Conditions', *Organized by LIRNEasia in association with the Pakistan Telecommunication Authority*, 26-27 April 2010, Islamabad, Pakistan
- Intec CXO Media Conclave 2010, organized by Intec Telecom Systems PLC, 22 May 2010, Colombo, Sri Lanka
- LIRNEasia Dissemination event and Tutorials, Singapore, *organized by LIRNEasia and the Communication and New Media, National University of Singapore*, 21 - 22 June 2010, Singapore
- Forum on Possibility of using Mobile Payments in Public Transport, *organized by LIRNEasia and the Pathfinder Foundation*, 23 June 2010, Colombo, Sri Lanka
- International Telecommunications Society (ITS) Biennial and Silver Anniversary Conference, *organized by the ITS Secretariat*, 27 - 30 June 2010, Tokyo, Japan

'Teleuse@BOP

- Meeting with IDRC Board of Governors, *organized by the IDRC*, 22 January 2009, Kalutara, Sri Lanka
- Teleuse@BOP Dissemination event - India, *organized in association with the Cellular Operators' Association of India*, 10 February 2009, Mumbai, India
- Teleuse@BOP Dissemination event - Sri Lanka, *organized by LIRNEasia*, 04 March 2009, JAIC Hilton, Colombo, Sri Lanka
- SA Connect Public Seminar Series, *organized by the Graduate School of Business, University of Cape Town, South Africa*, 14 April 2009, Cape Town, South Africa
- Connectivity and Convergence: Alternative Regulatory Strategies for Telecommunications, organized by LIRNE.NET in collaboration with the Graduate School of Business at the University of Cape Town, 14 - 17 April 2009, Cape Town, South Africa
- "Mobile 2.0: Beyond Voice?" Pre-conference of the International Communication Association (ICA), *organized by LIRNEasia in association with ICA*, 20 - 21 May 2009, Chicago, USA
- 3rd Annual Connecting Rural Communities Asia Forum, *organized by the Commonwealth Telecommunications Organisation (CTO)*, 23 - 25 June 2009, New Delhi, India
- IDRC PAN-All conference, *organized by IDRC*, 12 - 14 June 2009, Penang, Malaysia
- Release of Teleuse@BOP3 Migrant findings: Dhaka, *organized by LIRNEasia*, 28 June 2009, Dhaka, Bangladesh
- TEDx Colombo, *organized by TEDx Colombo*, 19 July 2009, Colombo, Sri Lanka
- Asian Telecom Seminar, *organized by the Symbiosis Institute of Telecom Management*, 25 - 26 September 2009, Pune, India
- The 37th Research Conference on Communication, Information, and Internet Policy, *organized by Telecom Policy Research Conference (TPRC)*, 25 - 27 September 2009, Virginia, USA
- Workshop: Policy Coherence in the Application of Information and Communication Technologies for Development, *organized by the OECD and infoDev/World Bank*, 10 - 11 September 2009, Paris, France
- Mobile communication and social policy, *organized by Rutgers University, New Jersey, USA*, 9 - 11 October 2009, New Jersey, USA
- Training workshop on communicating for influence on policy for researchers, *organized by the "DREAM IT" Mega Mongolia Project*, 16-17 October 2009, Mongolia
- Training workshop, "Measuring ICT Access and Use by Households and Individuals" conducted by ITU and LIRNEasia, *organized by LIRNEasia and the ITU and hosted by the Ministry of Information and Communication Technology (MICT), Thailand*, 19 - 23 October 2009, Bangkok, Thailand
- Broadband QoSE Dissemination event, *organized by LIRNEasia in association with IIT-Madras*, 03 November 2009, Chennai, India
- Mobile 2.0 "eGovernment" study Dissemination event, *organized by LIRNEasia*, 05 November 2009, New Delhi, India
- OECD workshop on "Expanding access to the Internet and broadband for development", *organized by the OECD*, 16 November 2009, Sharm el Sheikh, Egypt
- Alternatives for Infrastructure Development and Broadband Access, *organized by the Secretariat of Strategic Affairs*, 16 November 2009, Brazil
- National Symposium at the Indira Ghandi National Open University, *organized by the Indira Ghandi National Open University*, 20 November 2009, New Delhi, India
- CPRsouth4, *organized by CPRsouth secretariat and LIRNEasia*, 5 - 8 December 2009, Negombo, Sri Lanka
- LIRNEasia@5: Research --> Policy --> Knowledge-based economies, *organized by LIRNEasia*, 9 - 11 December 2009, Colombo, Sri Lanka
- Pacific Telecom Conference 2010, *organized by the PTC Secretariat*, 17 - 20 January 2010, Hawaii, USA
- ICTs and development: an international workshop for theory, practice and policy, *organized by the Indian Institute of Technology, Delhi*, 11 - 12 March 2010, New Delhi, India

- ITU-APT Annual Convention on Equitable Communication for All, *organized by the ITU-APT Foundation of India*, 22 March 2010, New Delhi, India
- 18th Convergence India, *organized by Exhibitions India Group*, 23 - 25 March 2010, New Delhi, India
- The 25th European Communications Policy Research Conference (EuroCPR), *organized by the EuroCPR secretariat*, 28 - 30 March 2010, Brussels, Belgium
- CPRAfrica Young Scholar tutorials, *organized by Research ICT Africa*, 18 - 19 April 2010, Cape Town, South Africa
- CPRAfrica, *organized by Research ICT Africa*, 19 - 21 April 2010, Cape Town, South Africa
- Training Seminar on New Technologies and their Challenges for Telecommunications Regulation in Latin America, *organized by DIRSI and ACORN-REDECOM (Americas Communication Research Network / Red Americana de Investigación en Información y Comunicación)*, 13 May 2010, Brasilia, Brazil
- Intec CXO Media Conclave 2010, *organized by Intec Telecom Systems PLC*, 22 May 2010, Colombo, Sri Lanka
- LIRNEasia Dissemination event and Tutorials, Singapore, *organized by LIRNEasia and the Communication and New Media, National University of Singapore*, 21 - 22 June 2010, Singapore
- ICA 2010 Preconference Workshop, 'Innovations in Mobile Use', *organized by SIRCA*, Nanyang Technological University, 21 - 22 June 2010, Singapore
- International Communication Association Conference 2010, *organized by the ICA Secretariat*, 22 - 26 June 2010, Singapore
- International Telecommunications Society (ITS) Biennial and Silver Anniversary Conference, *organized by the ITS Secretariat*, 27 - 30 June 2010, Tokyo, Japan

Other

- Sanvada on The Future of Sri Lanka's Economic and other Relations with India, *Organized by The Pathfinder Foundation*, 13 January 2009
- Consultation on Open Policy Formulation, *organized by LIRNEasia*, 17 January 2009
- Sanvada on The Impact of the New Electricity Act & Regulatory Challenges, *organized by the Pathfinder Foundation*, 13 May 2009
- Roundtable on SAFTA: Prospects and opportunities for trade in services, *Organized by The SAARC Chamber of Commerce and Industry*, 24 June 2009
- Seminar on the Draft National Transport Policy of the Ministry of Transport., *organized by the Pathfinder Foundation in collaboration with The Chartered Institute of Logistics and Transport.*, 23 July 2009
- Mobile 2.0 "eGovernment" study Dissemination event, *organized by LIRNEasia*, 05 November 2009
- Talk at the Centre of Policy Research, India, *organized by the Centre for Policy Research, India*, 11 March 2010
- Training Seminar on New Technologies and their Challenges for Telecommunications Regulation in Latin America, *organized by DIRSI and ACORN-REDECOM (Americas Communication Research Network / Red Americana de Investigación en Información y Comunicación)*, 13 May 2010
- Sanvada on "Achieving 8% growth rate of Mahinda Chintana: Constraints & Challenges", *Organized by the Pathfinder Foundation*, 30 June 2010

Internal Meetings, April 2008 – June 2010

Teleuse@BOP3

- CKS Qualitative Planning Workshop, *organized by LIRNEasia in association with CKS*, 15 January 2009, Colombo, Sri Lanka
- CKS Qualitative Training Workshop, *organized by LIRNEasia in association with CKS*, 16 January 2009, Colombo, Sri Lanka
- CKS Teleuse@BOP Qualitative analysis workshop, *organized by CKS*, 08 - 09 March 2009, Bangalore, India

Indicators

- TRE planning workshop, , 10 May 2008, Negombo, Sri Lanka

Mobile 2.0

- Internal brainstorming meeting on Mobile Money: Part 1, *Organized by LIRNEasia*, 09 March 2010, Colombo, Sri Lanka
- Internal brainstorming meeting on Mobile Money: Part 2, *Organized by LIRNEasia*, 19 March 2010, Colombo, Sri Lanka

General

- Research Planning Meeting: Teleuse@BOP3 and Mobile 2.0@BOP, *organized by LIRNEasia*, 28 - 30 November 2008, Negombo, Sri Lanka
- LIRNE.NET Partner Meeting, *Organized by Research ICT Africa (RIA)*, 21 - 22 April 2009, Cape Town, South Africa
- Kukule Ganga 2010-12 proposal planning, *Organized by LIRNEasia*, 10 July 2009, Kukule Ganga, Sri Lanka
- SME Planning Meeting, *Organized by LIRNEasia*, 26 November 2009, Colombo, Sri Lanka

How the developing world may participate in the global Internet Economy: Innovation driven by competition^{*}

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Report for Joint Workshop on “Policy coherence in the application of information and communication technologies for development,” organized by the Organization for Economic Co-operation and Development (OECD) and the Information for Development Program (*infoDev*), World Bank, 10-11 September 2009, Paris, France

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How the developing world may participate in the global Internet Economy: Innovation driven by competition

Executive Summary

Full participation in the global Internet Economy requires electronic connectivity of considerable complexity. Today, due to a worldwide wave of liberalization and technological and business innovations in the mobile space, much of the world is electronically connected, albeit not at the levels that would fully support participation in the global Internet Economy. Yet, many millions of poor people are engaging in tasks normally associated with the Internet such as information retrieval, payments and remote computing using relatively simple mobiles. Understanding the business model that enabled impressive gains in voice connectivity as well as the beginnings of more-than-voice applications over mobiles is important not only because widespread broadband access among the poor is likely to be achieved by extending this model but because it would be the basis of coherent and efficacious policy and regulatory responses.

This report demonstrates that voice connectivity was achieved for a majority of the world's people, including substantial numbers of the poor, because governments removed or lowered barriers to participation in the supply of telecom services and created conditions somewhat conducive to competition, even if less than perfect. This was the necessary condition. Where multiple suppliers existed, intense competition, the critical step of implementing the budget telecom network model, occurred. The radically lower prices attracted more minutes of use, which in turn made further reductions possible. Operators were able to load their networks with high volumes of revenue-yielding minutes because they had succeeded in reducing the transaction costs of dealing with low-volume customers. Prepaid, which accommodates the needs of those with irregular earning patterns was also a critical element. Along with these business process innovations, the exponents of the budget telecom network model also succeeded in drastically reducing costs, especially opex. The new model makes ARPU [Average Revenue per User] irrelevant because what really matters is how many revenue-yielding minutes are carried on the network, not how much money is earned from a customer. In the same way that Ryan Air and Air Asia make profits while conventional airlines lose money, budget telecom networks make more money than conventional operators. However, the model increases the volatility of earnings and results in lower quality of service.

The extension of the budget telecom network model to broadband requires that small, prepaid, irregular payments be allowed, which is a significant deviation from the dominant always-on, all-you-can-eat models. It appears that the former is already emerging in the mobile-based broadband offerings such as HSPA.

This suggests that accessing the Internet over mobile networks, whether from fixed locations, nomadically or while actually mobile, will become a major, if not the dominant, mode. This fits into the present trends where many functions of the Internet, such as communication in multifarious forms, information retrieval and

remote computing, are increasingly occurring over mobile networks through relatively modest and inexpensive mobile handsets.

If business process innovations enabled by competition are solving the problem of electronically connecting billions of poor people, what is the role of government? When a business model is delivering the goods, rather than direct government action, the most appropriate government action would be that which supports the business model. Policy and regulatory actions must be derived more from analysis of the requirements of the business model and less from public administration theory. Early in the present reform cycle the need to adopt policy and regulatory solutions that fitted the specific institutional circumstances was identified. Yet, in actual practice, policy and regulatory solutions devised for developed-country circumstances tended to be applied in very different settings. The emergence of a new business model and deeper understanding of the functioning of government institutions in developing countries offers a possibility of devising policy and regulatory solutions with a better fit. This would, for example, involve a greater emphasis on lowering market-entry barriers and making available more spectrum ahead of the previous preoccupation with interconnection. As costs come down across the board, the relative importance of the key input of domestic and international backhaul capacity increases, requiring greater regulatory attention.

Coherence of different policy and regulatory actions is a good thing. It can be achieved by fully understanding the core budget telecom network business model and ensuring that all policy and regulatory actions are consistent with it, not solely in terms of making the model work, but also in terms of ensuring that public-policy objectives are achieved by leveraging the model rather than working at cross purposes to it.

1.0 Foundation of the global Internet Economy: Electronic connectivity

Full participation in the global Internet economy requires electronic connectivity of some complexity. Today, due to a worldwide wave of liberalization and technological and business innovations, much of the world is electronically connected, albeit not at the levels that would support full participation in the global Internet economy. This report examines the contributions made by competition and business innovation in achieving this level of connectivity and the possibilities of extrapolation to ensure widespread participation in the global Internet Economy. It focuses on the developing world. Within the developing world, the hardest problem is that of connecting the low-income groups. This report addresses this problem, drawing extensively from research conducted in South and Southeast Asia, on the basis that solutions to the hardest problem are likely to make other solutions easy. In the concluding section, the policy implications, including the articulations with tax and other policies that must be aligned if access is to translate into wealth creation, are discussed.

The OECD Member Governments have set out a vision of the Internet Economy, covering the full range of economic, social and cultural activities supported by the Internet and related information and communications technologies (ICTs), which will strengthen the capacity of countries to improve the quality of life of all their citizens by:

- Providing new opportunities for employment, productivity, education, health and public services as well as addressing environmental and demographic concerns.
- Acting as a key driver for the creation of enterprises and communities and stimulating closer global co-operation.
- Enabling new forms of civic engagement and participation that promote diversity of opinions and enhance transparency, accountability, privacy and trust.
- Empowering consumers and users in online transactions and exchanges.
- Reinforcing a culture of security which applies to information systems and networks, and their users.
- Developing an increasingly important platform for research, international science co-operation, creativity and innovation in many different sectors.
- Creating opportunities for new economic and social activities, applications and services through ubiquitous and seamless access to communication and information networks.
- Promoting a global information society based on fast, secure and ubiquitous networks which connect billions of people, machines and objects.¹

The very facts that the OECD holds Ministerial meetings on the subject and resolves to promote ubiquitous access to ICTs and take other actions to advance the

¹ OECD (2008, June). *The Seoul Declaration for the future of the Internet economy*, pp. 4-5.

realization of the global Internet Economy indicates that they have not yet been fully realized even within the OECD. The Internet Economy is far from real for the billions living in developing countries, especially those who are poor. The OECD Ministerial takes this into account explicitly by declaring that it seeks to make the Internet Economy truly global, through policies that:

- Support expanded access to the Internet and related ICTs, especially for people in developing countries.
- Recognise the potential of the Internet and related technologies to provide enhanced services to people with disabilities and special needs.
- Recognise the importance of a competitive environment for the successful growth of the Internet Economy and the opportunities this can bring for development, particularly for people and regions with the most limited economic means.
- Promote use of Internet and related ICT networks by all communities as well as the creation of local content and multi-language translations to improve economic and social inclusion of people with different capabilities, education, and skills, and to preserve cultural and linguistic diversity.
- Facilitate the introduction of internationalised domain names (IDNs) while ensuring the integrity and stability of the Internet.
- Increase cross-border co-operation of governments and enforcement authorities in the areas of improving cyber-security, combating spam, as well as protecting privacy, consumers and minors.
- Harness the potential of the Internet to tackle global challenges such as improving energy efficiency and addressing climate change.²

The key point, for the purposes of this report, is the third bullet point which flags the importance of a competitive environment for the flourishing of the Internet Economy, especially for people and regions with the most limited economic means. As documented below, the massive progress achieved in the past few decades in bringing electronic connectivity to the hitherto unconnected in the developing world has indeed been made possible by the opening up of opportunities to participate in the offering of connectivity services, allowing varying degrees of competition. Success in deepening that connectivity to always-on, broadband forms will also require adherence to the principle of competition and increased emphasis on its effective implementation.

The mental image many have of the Internet involves a desktop (or laptop) computer connected by wire (or wirelessly) to an access path of adequate capacity to allow always-on capacity to handle down- and up-loads of data at certain speeds or to a broadband connection. However, there is increasing awareness of the importance of mobiles as an alternative pathway, as evidenced by documents such as the World Economic Forum's 2008-09 *Global Information Technology Report*, "Mobility in a networked world," and Aspen India's 2008 Report entitled "m-

² OECD (2008, June). *The Seoul Declaration for the future of the Internet economy*, pp. 8-9.

Powering India: Mobile communications for inclusive growth,”³ as well as the following excerpt from *The Economist*:

... the number of mobile phones that can access the internet is growing at a phenomenal rate, especially in the developing world. In China, for example, over 73m people, or 29% of all internet users in the country, use mobile phones to get online. And the number of people doing so grew by 45% in the six months to June—far higher than the rate of access growth using laptops, according to the China Internet Network Information Centre.⁴

Broadband has been defined by Partnership for Measuring ICT for Development as an Internet service of at least 256 kbps in one or both directions.⁵ The US Federal Communication Commission is also seeking to develop a definition of broadband.⁶ Separate definitions are given for fixed-line and mobile broadband which would probably not have been the case 10 years ago. The incomplete nature of the definitions indicates that the phenomenon is inchoate.

Rather than this composite, common-sense image, there is value in thinking of the Internet, or the cluster of technologies enabling the Internet Economy, in terms of a bundle of functions. The following functions are currently provided over the Internet:

- Communication in multiple forms, synchronous/asynchronous, one-to-one/one-to-many, etc.
- Information retrieval
- Publication
- Transactions (including payments), and
- Remote computing

The hierarchy above may be described as moving from simple to complex. It is no surprise that a sophisticated user sitting at the end of a multi-megabyte pipe can use all the above functions easily, especially if she has a credit/debit card. However, what is surprising is that many people who have never been near a computer in their lives are already performing some of these functions electronically.

For example, take a poor person with a prepaid mobile connection. When such a person types in a short code to check his account balance, he is engaging in one of the more complex of current Internet functions, remote computing. When he downloads a ringtone and pays for it from the “load” on his prepaid phone he is

³ Dutta, S. and Mia, I. (2009). *Global Information Technology Report 2008-09, Mobility in a networked world*, Geneva: World Economic Forum and INSEAD; Adler, R.P. & Uppal, M. (2008). *M-Powering India: Mobile communications for inclusive growth*, Washington DC: Aspen Institute.

⁴ The Economist (2008, September 4). The meek shall inherit the web. *The Economist*. (http://www.economist.com/research/articlesBySubject/displaystory.cfm?subjectid=348963&story_id=11999307)

⁵ Partnership for Measuring ICT for Development *Core list of ICT Indicators* (Revised 2009), at: http://www.itu.int/ITU-D/ict/partnership/material/CoreICTIndicators_e_rev2.pdf; accessed 18 August 2009. OECD (n.d.) *OECD Broadband Subscriber Criteria*, retrieved July 24, 2009 from http://www.oecd.org/document/46/0,3343,en_2649_34225_39575598_1_1_1_1,00.html.

⁶ <http://blog.broadband.gov/?p=87>, retrieved August 20, 2009.

engaging in a transaction that includes an electronic payment, again, something quite complex.

The mobile is used for all forms of communication, including text-based (SMS) and context-based (“missed calls”) communication.⁷ All these functions can be performed with the simplest of today’s second-generation mobile handsets even in countries that have yet to release the frequencies needed for 3G [third generation] or sophisticated data-friendly services. In sum, billions of poor people in developing countries are also participating in the Internet Economy, albeit in somewhat constrained and unfamiliar forms.

As countries introduce 3G mobile networks, the migration of high-end phones to low-income users will accelerate. As of October 2008, the modal value of new phones among SEC [Socio-Economic Classification] groups D and E⁸ in Bangladesh was USD 43 (mean USD 58); the modal value of second-hand phones was USD 29 (mean USD 35). Qualitative research conducted as part of LIRNEasia’s teleuse@BOP3 study showed that many of the second-hand phones were quite sophisticated. Both types were being used to transfer music from one phone to another using Bluetooth, to listen to music, to watch video, to play games, to obtain news and employment information (sometimes as the sole source), and to keep records of transactions. The range and frequency of uses was much higher among the poor in Sri Lanka, the Philippines and Thailand, countries with relatively higher levels of disposable income.

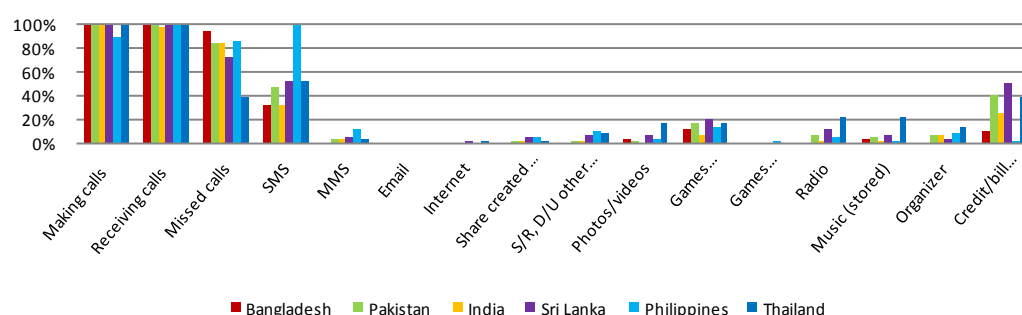


Figure 1: What mobiles are used for at the BOP (% of SEC D and E mobile owners)⁹

Source: LIRNEasia (2009). Teleuse@BOP3 Survey findings.

⁷ Sivapragasam, N., Zainudeen, A., Ratnadiwakara, D. (2008). *Hit me with a missed call: The use of missed calls at the bottom of the pyramid (BOP)*. Paper presented at CPRsouth3: Transformation Strategies for Telecom Operators, Beijing, December 5-9, 2008, retrieved July 27, 2009, from <http://www.cprsouth.org/sites/default/files/Nirmali%20Sivapragasam.pdf>

⁸ Defined by the chief wage earner’s education and occupation (as well as a few other parameters in certain countries), but closely correlated to an income level of around USD 2 a day in five of the six countries included in LIRNEasia’s ~10,000 sample, representative survey of teleuse @ the Bottom of the Pyramid: Bangladesh, India, Pakistan, Sri Lanka and Thailand. In the Philippines, only SEC E respondents were interviewed. For more detail, see, <http://lirneasia.net/projects/2008-2010/bop-teleuse-3/>.

⁹ Categories: Making calls; receiving calls; missed calls; SMS; MMS; e-mail; Internet; share created content; send/receive or download/upload other content; photos/videos; games (individual); games (interactive); radio; music (stored); organizer; credit/bill checking

The Teleuse@BOP survey specifically probed awareness, trial and use by poor people of “more-than-voice” services over the mobile. These were low, unsurprisingly, because these services are just being developed and marketed and the business models of marketing information and transaction services to the poor are still being worked out. What is ground for optimism, however, is the clear evidence of higher awareness, trial and use of more-than-voice among the younger cohorts (Figure 2).

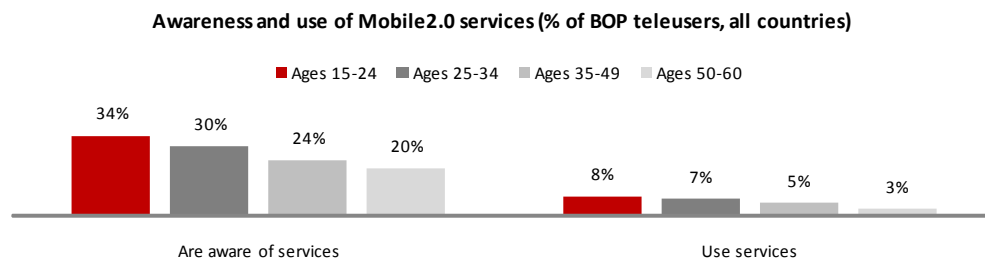


Figure 2: Awareness and use of Mobile2.0 (more than voice) services (% of SEC D and E teleusers, all countries)

Source: LIRNEasia (2009) Teleuse@BOP3. Survey findings

It is increasingly becoming clear that agricultural information is better provided on the almost-ubiquitous mobile, where information is available when and wherever the user wants it, rather than in distant kiosks with opening and closing hours or even in homes. Innovative companies such as CellBazaar in Bangladesh are introducing rudimentary e-commerce to BOP users who might otherwise never get access to such services.¹⁰ Information on candidates in the recent Indian election, such as whether or not they had criminal records, their educational attainments and assets and liabilities, were available through SMS.¹¹ BuzzCity and Gupshup are creating social networking in the mobile space.¹² Once the regulatory issues of m-payments are resolved,¹³ it is likely that mobile phones, not credit cards, will become the main modes of e-payment in the developing world, as is already occurring in some parts of Africa.¹⁴

That billions of poor people have not only become electronically connected in the past few decades,¹⁵ but have also begun to use some of the functions of the meta-

¹⁰ Zainudeen, A., Samarajiva, R., and Sivapragasam, N. (2009). CellBazaar: A mobile-based e marketplace: Success factors and potential for expansion. Paper presented at Mobile 2.0: Beyond Voice?, Chicago, IL, May 20-21, 2009, retrieved July 28, 2009 from http://lirneasia.net/wp-content/uploads/2009/05/final-paper_zainudeen_et_al.pdf

¹¹ Giridharadas, A. (2009, May). A pocket-size leveler in an outsize land. *New York Times*, retrieved July 28, 2009 from <http://www.nytimes.com/2009/05/10/weekinreview/10giridharadas.html?ref=world>

¹² Sirasoonthorn, P. (2009). Business Models for Delivering Mobile Value-Added Services. Working paper presented at LIRNEasia colloquium, Colombo, July 13, 2009.

¹³ Alampay, E. and Bala, G. (2009) *Mobile 2.0: m-money for the unbanked*. Working paper presented at LIRNEasia colloquium, Colombo, June 30, 2009.

¹⁴ Greenwood, L. (2009, August 12). Africa's mobile banking revolution. <http://news.bbc.co.uk/2/hi/business/8194241.stm>

¹⁵ http://www.itu.int/newsroom/press_releases/2008/29.html

medium known as the Internet is cause for celebration, but not for complacency. The present capabilities of the 2G networks and handsets used by most poor people do not, for example, allow for the complex search and information retrieval activities taken for granted in conventional desktop/laptop and fixed-broadband Internet use. Publishing, in the commonly understood sense of posting on websites and blogs, is quite cumbersome from a simple mobile handset, Twitter excepted.¹⁶ The qualitative research conducted as part of the LIRNEasia Teleuse@BOP study showed that heavy users tended to use both modes, for example, downloading music at cybercafés, transferring via Bluetooth and then listening on the mobile handsets.¹⁷

There is little question then, that access to broadband in both forms, mobile and fixed, must be improved if the emerging Internet Economy is to be inclusive. Governments the world over must expedite spectrum refarming and release by transparent means¹⁸ to enable operators to offer 3G technologies and beyond to make mobile, nomadic and fixed broadband a reality for the billions who will depend on a wireless access network as the gateway to the Internet Economy. Looking at spectrum solely as a source of revenue at point of release is not the best either for broad deployment or for long-term revenue generation through taxes.

The value of wireless in the access network or the “last mile” does not negate the fundamental importance of wireguides in the backhaul component. Behind each WiFi hotspot is a series of wireguides that connect the user to the Internet cloud, in most cases, in the continental United States. In the same way that the strength of a chain is determined by the strength of its weakest link, the performance of one’s Internet connection is determined by the slowest component in the connection to the Internet cloud.¹⁹ LIRNEasia-IIT Madras research on broadband quality of service experience (QoSE) has shown that the real bottleneck for most users in developing countries is the international segment,²⁰ where undersea cable or satellite capacity still appears to be under-provisioned by operators (Figure 3).

¹⁶ Chapman, J. and Kinsey, M. (eds.) (200). *Broadcast journalism: A critical introduction*. London: Routledge, p. 131.

¹⁷ CKS Consulting Pvt. Ltd. (2009). Teleuse@BOP3: A Qualitative Study. Colombo: LIRNEasia, pp. 111-112, <http://lirneasia.net/wp-content/uploads/2008/04/qualitativereport.pdf>

¹⁸ Samarajiva, R. (2006). Preconditions for effective deployment of wireless technologies for development in the Asia-Pacific, *Information Technology and International Development*, 3(2): 57-71. <http://itidjournal.org/itid/article/view/224/94>; Wellenius, B. and Neto, I. (2007). Managing the radio spectrum: Framework for reform in developing countries. <http://siteresources.worldbank.org/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/Resources/Wellenius-Neto.pdf>, retrieved August 20, 2009. Malik, P. (2009). An evaluation of different models for the issuance of licenses for service provision and frequencies. Working paper presented at LIRNEasia colloquium, Colombo, July 9, 2009.

¹⁹ Goswami, D. (2008). Wi-Fi: The network fix. In R. Samarajiva and A. Zainudeen (Eds.), *ICT infrastructure in Emerging Asia: Policy and Regulatory Roadblocks* (pp. 131-156). New Delhi & Ottawa: SAGE & IDRC.

²⁰ Gonsalves, T. and Bharadwaj, A. (2009). Comparison of AT-Tester with other popular testers for Quality of Service Experience (QoSE) of an Internet connection. Paper presented at LIRNEasia colloquium, Colombo, July 29, 2009.



Figure 3: Return trip time (RTT) to www.yahoo.com, 24 July 2009 1350hrs

Note: This route graph is taken using VisualRoute 2009 Lite edition. Y-axis indicates the return trip time (RRT) to a server. Up to 6th hop IP addresses are within Sri Lanka (www.whois.net); the 'leap' is from a local server to the first entry point to USA.

Source: LIRNEasia (2009, July 24). Broadband Quality of Service Experience. Test findings.

Clearly, much has to be done in improving the supply of international and national backhaul capacity which is a constraint for bringing both rich and poor alike in developing countries into the Internet Economy. Unless these producer goods are plentiful and reasonably-priced, broadband for the poor cannot be realized. The best way to achieve this, as elaborated below, is through policy actions conducive to participation by a greater number of suppliers in the backhaul market.

2.0 How was this foundation laid?

The connecting of a majority of the world's population to electronic networks, directly or through the connections of others, within a few decades is an extraordinary public-policy achievement. It is claimed that there are over 4 billion active SIMs in the world,²¹ and a majority of the world phones are now mobile. To get from the gloomy, but effective in hindsight, prognostications of the Maitland Commission in 1984 to the status quo in which the 87 percent of the poor in the Indo-Gangetic Plain, the world's largest concentration of poor people, have made a phone call in the last three months and 41 percent own a mobile or fixed phone has taken only 24 years.²² Understanding the causal factors is important not only

²¹ GSMA (2009, February 11). The mobile world celebrates four billion connections. <http://www.gsmworld.com/newsroom/press-releases/2009/2521.htm> retrieved August 20, 2009.

²² Kelly, T. (2005). Twenty years of measuring the missing link. In G. Milward-Oliver (Ed.), *Maitland+20 Fixing the Missing Link* (pp. 23-33). Bradford on Avon: The Anima Centre Limited; Independent Commission of the Independent Commission for World Wide Telecommunications Development (1985). *The Missing Link. Report of the Independent Commission for World Wide*

because the electronic foundation for the Internet Economy is not yet complete, but because there is value in learning the lessons of success in narrowband, voice connectivity in order to adapt them for the tasks of ensuring broadband connectivity for all. Or, minimally, there is value in understanding what did not work in narrowband voice, so that those failed solutions can be avoided.

The key to first-generation connectivity for the poor is shown by Figure 4, adapted from a Figure first developed by the Telecommunication Regulatory Authority of India (TRAI). Lower prices invariably lead to greater connectivity, which lead to even lower prices and even greater connectivity.

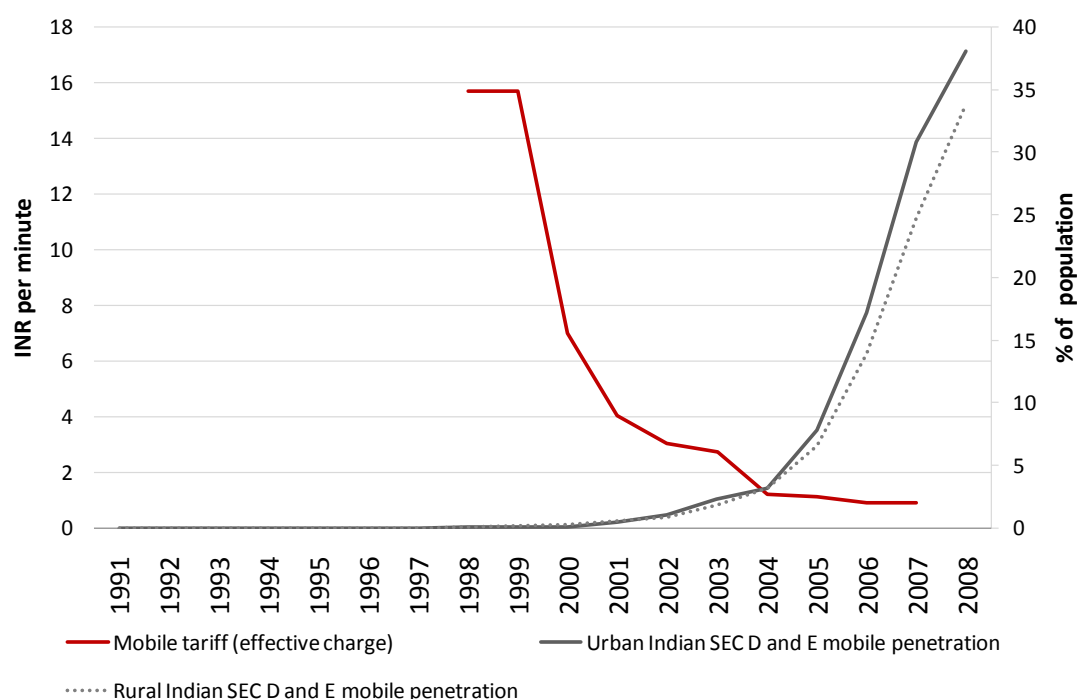


Figure 4: Mobile tariffs and the growth of Indian mobile in SEC D and E

Sources: Adapted from TRAI (2005). Recommendations on Growth of Telecom Services in Rural areas: The way forward, retrieved August 4, 2009 from <http://ccaharyana.gov.in/recom3oct05.pdf>; LIRNEasia (2009) Teleuse@BOP3. Survey findings

Across countries, the trigger to growth was significant market entry. This took the form, for example, of transparent entry in Pakistan, opaque licensing in Bangladesh or even “backdoor” entry by so-called fixed operators into the mobile space in Nepal. What matters is that there should be a significant enough number of suppliers, with one of them at least being willing to engage in disruptive competition.²³ In different countries, different operators assumed this role. In India,

Telecommunications Development. Geneva: ITU; de Silva, H., and Zainudeen, A. (2008). Teleuse at the Bottom of the Pyramid: Beyond Universal Access. *Telektronikk* (2), 25-38.

²³ Christensen, C. M. and Raynor M. E. (2003). *Innovator's Solution: Creating and Sustaining Successful Growth*. Boston: Harvard Business School Press. This contrasts with the “managed competition” approach espoused by the McKinsey contributors to the Global information technology

it was Reliance who created the disruption and caused others to follow. In Thailand, it was the acquisition of a Thai-owned operator by a foreign operator that served as the trigger. In Sri Lanka, it was the late entry of the incumbent fixed operator into the mobile space through an acquisition that set off the truly rapid growth phase.

Growth in connectivity cannot occur without investment.²⁴ The relaxation of government imposed barriers to market entry has created an environment of high investment, supplied in most countries with the notable exception of India, by external sources. Even in India, telecom was the sector that attracted the second largest amount of FDI in absolute terms and the government raised the permitted FDI threshold to 74 percent in 2005.²⁵

Pakistan showed the most dramatic improvement in connectivity in South Asia, and possibly the world, in the past decade, as shown in Figure 5. Pakistan is not a small country, with a population of 162 million in 2007.²⁶ With a population/sq. km of 204, it is the least densely populated among the non-micro states in South Asia: Sri Lanka (305) India (342) and Bangladesh (1,101).²⁷ Generally low density poses additional difficulties in increasing connectivity.

Pakistan's per-capita GDP is considerably lower than that of Sri Lanka,²⁸ suggesting that its connectivity should be below that of Sri Lanka, based on the Jipp Curve.²⁹ But it is not, except with regard to overall access paths (fixed plus mobile connections, as shown in Figure 5), where Sri Lanka was at 55.58 at end 2007, compared to Pakistan's 51.12. This is a substantial narrowing of the gap since 2002, when Sri Lanka had 9.58 access paths/100, compared to Pakistan's 3.65.

report 2008-09: Dutta, S. and Mia, I. (2009). *Global Information Technology Report 2008-09, Mobility in a networked world*, Geneva: World Economic Forum and INSEAD, pp. 63-73.

²⁴ Mahan, A.K. and Melody, W.H. (2005). *Stimulating investment in network development: Roles for regulators*. Monte Video: World Dialogue on Regulation. Retrieved on July 27, 2009 from <http://www.infodev.org/en/Document.12.pdf>

²⁵ Malik, P. (2007). *LIRNEasia Six Country Multi-component Study 2006-2007: India report*. WDR Dialogue Theme 4th cycle Discussion Paper WDR0703. Retrieved July 27, 2009 from <http://www.lirneasia.net/wp-content/uploads/2007/04/malik-2007-6cmcs-india.pdf>

²⁶ World Bank (2009). *Key development data and statistics* [online database]. Retrieved July 27, 2009 from <http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20535285~menuPK:1192694~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html>

²⁷ Author calculations based on population and surface area data retrieved from World Bank (2009). *Key development data and statistics* [online database]. Retrieved July 27, 2009 from <http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/0,,contentMDK:20535285~menuPK:1192694~pagePK:64133150~piPK:64133175~theSitePK:239419,00.html>

²⁸ World Bank (2009, July) *Gross domestic product 2008: Quick reference tables*. Retrieved July, 31 2009 from <http://siteresources.worldbank.org/DATASTATISTICS/Resources/GDP.pdf>

²⁹ Jipp, A. (1963, July). Wealth of nations and telephone density. *Telecommunications Journal*, pp. 199-201.

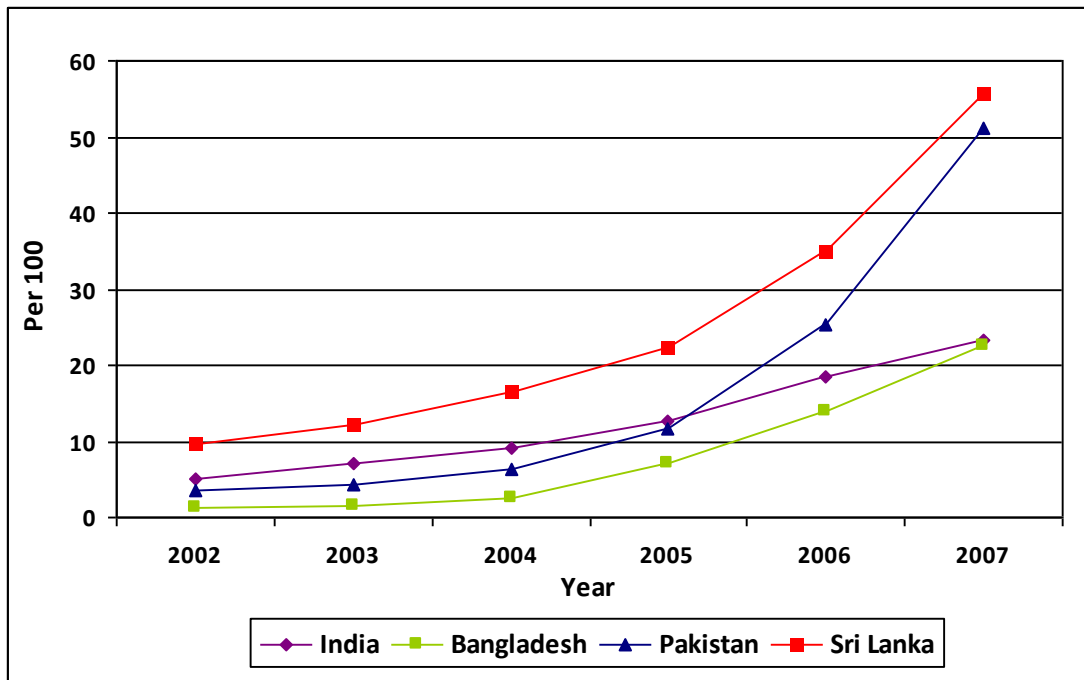


Figure 5: Access paths/100, 2002-07, Pakistan compared with South Asian peers

Source: ITU (2008). ICT statistics database. Retrieved from <http://www.itu.int/ITU-D/ict/ey/Indicators/Indicators.aspx>

How was this good performance achieved? Foreign Direct Investment (FDI) into the sector increased massively in 2002-07, as shown in Figure 6. From a negligible USD 6.04 million in 2002, it increased to USD 1,905.06 million in 2006 (accounting for over 50 percent of total FDI coming into the country) and USD 1824.25 million in 2007 (close to 40 percent of the total). The major reforms in Pakistan took effect in 2004, with the adoption of an exemplary licensing framework and the conduct of mobile license auctions. Mobile growth rocketed up from that point, as did FDI.

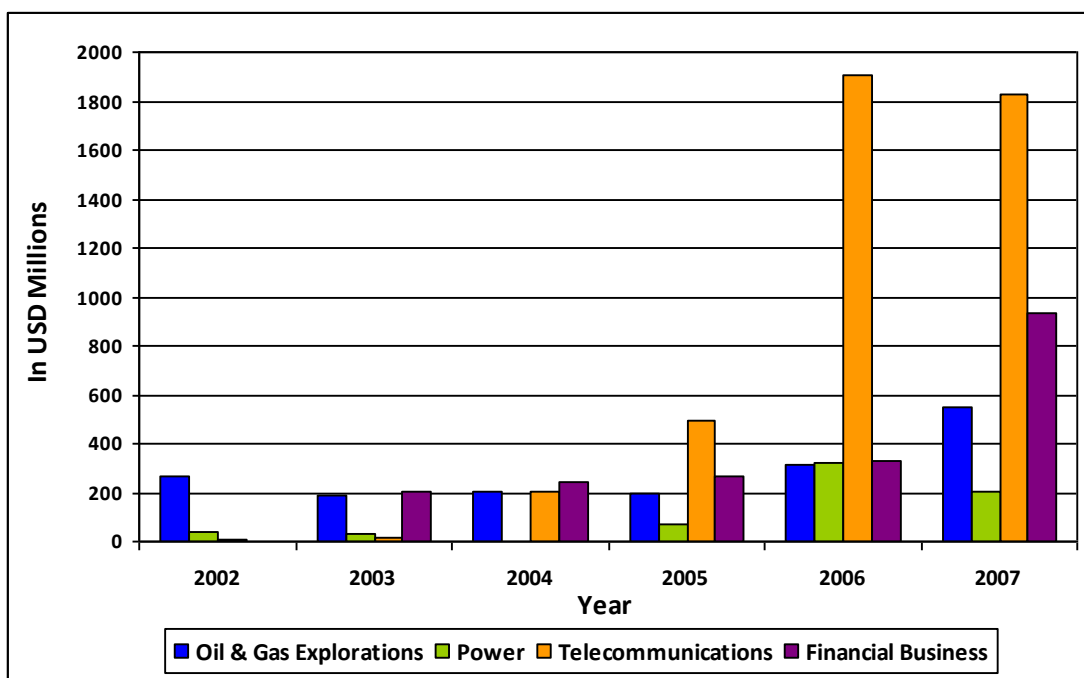


Figure 6: Foreign direct investment in the principal sectors in Pakistan, 2002-07

Source: State Bank of Pakistan (2008) Economic Data. Retrieved from

http://www.sbp.org.pk/ecodata/NIFP_Arch/index.asp

Note: FDI for the power sector in 2004 was USD -14.24 million.

3.0 Lessons from the mobile success story for broadband

In India, home to a significant proportion of the world's poor, connectivity is not associated with low use of the network; in fact, India's average minutes of use are double those of OECD countries.³⁰ The low prices and high use of the network in India point to the core explanation for the success of connecting billions in the past decade. It is the discovery and application of an entirely new business model in South Asia, the "budget telecom network model," akin to the budget airline model implemented by the likes of Air Asia and Ryan Air.³¹

The budget telecom network model first emerged in the South Asian markets of Bangladesh, India, Pakistan and Sri Lanka, evidenced by the fact that their total costs of ownership (TCO) were the lowest at less than USD 5 in 2007, compared to an average of USD 13.15 across 77 emerging economies.³² While volatile, the operators in the South Asian region tend to be quite profitable.

Table 1: Operator Revenues, EBITDA and EBITDA Margins in selected South Asian markets (2005)

Country	Revenue (USD)	EBITDA (USD)	EBITDA Margins (%)
Sri Lanka	259,041,928	124,833,464	48
India	26,723,674,194 (2007)	9,938,340,523 (2007)	37 (2007)
Bangladesh ³³	655,900,000	344,500,000	54
Pakistan	978,802,178	n/a	n/a

Sources: Sri Lanka: Company annual reports, press releases by companies; India: Malik, P. (2008). Telecom Regulatory and Policy Environment in India: Results and Analysis of the 2008 TRE Survey; Bangladesh: Bangladesh Telecommunications Regulatory Commission (2007) *Annual Report 2007*. Retrieved July 27, 2009 from http://www.btrc.gov.bd/btrc/annual_report_07_08_english.pdf; ³⁴ Pakistan: Pakistan Telecommunication Authority. (2005). *Annual Report 2005*. Islamabad: Pakistan Telecommunication Authority. Retrieved July 28 2009 from <http://www.pta.gov.pk/annual-reports/ann-rep-05.pdf>

³⁰ Teligen (2006). OECD telecoms price benchmarking baskets 2006: T-Basket implementation from February 2006 onwards. Retrieved July 28, 2009 from <http://www.teligen.com/publications/oecd.pdf>; Telecom Regulatory Authority of India (2008). The Indian Telecom Services Performance Indicators October– December 2007. Retrieved July 28, 2009 from <http://www.trai.gov.in/WriteReadData/trai/upload/Reports/41/preport10april08.pdf>

³¹ Nokia (2008a). Affordability key in bringing digital inclusion. *Expanding Horizons*, 1, 12-13; Nokia (2008b). A roadmap to affordable mobility in emerging markets. *Expanding Horizons*, 4, 4-7.

³² Nokia (2008a). Affordability key in bringing digital inclusion. *Expanding Horizons*, 1, 12-13. Nokia's TCO calculation is based on 1/36th of the price of the cheapest Nokia handset, 1/36th of connection charges if any, the cost of using the OECD low-user bundle of minutes and other services, plus all relevant taxes and levies.

³³ Data are only for the three main mobile service providers GrameenPhone, Aktel and Banglalink, whose total market share amounted to 93 percent in 2005.

³⁴ Revenue and EBITDA Margin for Bangladesh (2005) as reported by Merrill Lynch are different (Merrill Lynch, *Global Wireless Matrix*, 2007).

The difficult policy and regulatory environment and the low purchasing power of customers in the region appear to have compelled the operators to innovate, both in terms of squeezing operating expenditures and in terms of serving the “long tail”³⁵ of customers who use only a few minutes of calls a month. The latter innovation rests squarely on the reduction of transaction costs associated with supporting prepaid customers. Among the SEC D and E segment represented in the Teleuse@BOP study, the overwhelming majority are prepaid (Figure 7). The reduction of transaction costs is exemplified by the simple fact that prepaid avoids the more or less invariable costs of generating and transmitting a monthly bill, which becomes a serious burden when the revenue from the customer is very low.

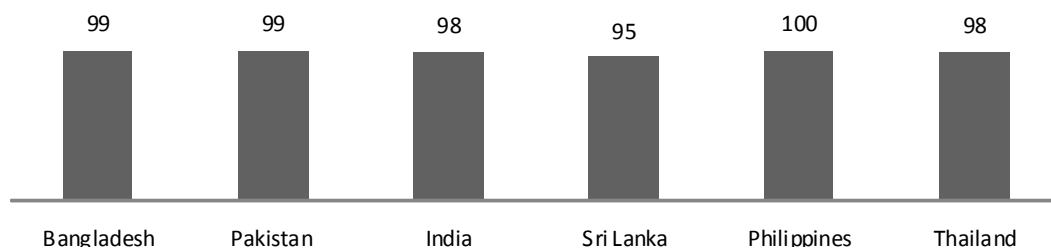


Figure 7: Prepaid mobile connections at the BOP (% of SEC D and E mobile phone owners)

Source: LIRNEasia (2009) Teleuse@BOP3. Survey findings

Prepaid also has a unique advantage in that it allows the customer to pay when he can or needs to use the service. This suits the requirements of the poor, many who have irregular income patterns. The introduction of low-value recharge cards and especially the electronic reloads that allow for the greatest flexibility in payments was of special significance in making the model work.³⁶

In essence, the budget telecom network business model is an innovation, driven by intense competition and in response to the hard regulatory environments and low purchasing power of the countries of South Asia. If not for competition, the innovation would not have happened. This was shown in Nepal, a country of 29 million people that has many similarities with the South Asian countries where the model is operational, but had relatively high mobile prices in 2008. In 2009, the prices of all mobile operators dropped sharply despite no new licenses being granted. It was found that the cause was entry, not of the conventional kind, but of

³⁵ Anderson, C. (2006). *The Long Tail: Why the future of business is selling less of more*. New York: Hyperion Books. Whereas Anderson focuses on the long tail of products such as low-demand books, the budget telecom network model is based on the long tail of low-volume customers.

³⁶ Nokia (2008b). A roadmap to affordable mobility in emerging markets. *Expanding Horizons*, 4, 4-7; Samarajiva, R. and Malik, P. (2009, May 22). The economics of the chhota recharge. *The Financial Express*. Retrieved from <http://www.financialexpress.com/news/the-economics-of-chhota-recharge/463849/3>

a form of backdoor entry where CDMA operators licensed as “fixed” operators had entered the mobile space.³⁷

What lesson does the budget telecom network model hold for “expand[ing] access to the Internet and related ICTs, especially for people in developing countries”?

To expect that conventional models of always-on, all-you-can-eat broadband will connect the billions of poor people now connected only to voice, if at all, is as realistic as expecting the conventional business model of voice telephony to have succeeded in connecting the poor in the Indo-Gangetic Plain. As with voice telephony, it is imperative that opex be lowered. This will include, most importantly, the key input cost of international backhaul. The radical reductions in domestic leased-line prices that have been observed in the emerging economies suggest that there is plenty of room for improvements in the levels of competition in leased lines, and in some sectors, especially Africa and parts of the Indian Ocean, greater supply. India, one country that has paid sustained attention to domestic and international leased-line prices has reduced both in dramatic ways (Table 2 and Table 3).

Table 2: Trends in Domestic Leased line tariffs in India (for highest distance slab, i.e., > 500 km) for the Incumbent, USD per annum, 1998-2005

Year	Capacity			
	64Kbps	2Mbps(E1)	DS-3	STM-1
1998	33,043	157,885	3,315,582	9,946,745
1999*	2,207	50,586	1,062,313	3,186,940
2000	2,053	47,059	988,235	2,964,706
2001	2,003	32,137	674,875	2,024,624
2002	1,994	31,990	671,791	2,015,372
2003	2,106	33,779	608,028	1,824,084
2004	2,183	20,009	420,191	1,260,573
2005	2,103	19,281	404,908	1,214,724
November 2005 *	986	19,041	137,970	370,072

Source: Kathuria, R. (2009). Comparing the impact of decline in leased line prices in India and Indonesia: Lessons for Latin America. Paper for ACORN-REDECOM [Americas Communication Research Network- Red Americana de Investigación e Información y Comunicación]

**Regulatory price revision implemented*

Table 3: IPLC (Half Circuit) Tariff, India to US, 2000-2008 (USD per annum)

Year	Capacity		
	E1	DS3	STM1
1998	413,631.02	-	-
1999	404,690.73	-	-

³⁷ This finding contradicts the recommendations for limited entry propounded by the McKinsey contributors in Dutta, S. and Mia, I. (2009). *Global Information Technology Report 2008-09, Mobility in a networked world*, Geneva: World Economic Forum and INSEAD, pp. 63-73.

2000	342,245.99	6,203,208.56	17,967,914.44
2001	333,889.82	6,203,208.56	17,529,215.36
2002	54,009.14	979,019.53	2,835,479.85
2003	67,558.68	1,033,779.34	2,994,077.65
2004	53,888.13	1,011,823.56	2,808,094.59
2005	44,390.89	790,753.72	2,191,717.79
Nov-05	28,483.79	227,870.29	655,127.08
2006	26,209.68	209,677.42	602,598.57
2007	25,158.19	201,366.74	578,840.80

Source: Kathuria, R. (2009). Comparing the Impact of Decline in Leased Line Prices in India and Indonesia: Lessons for Latin America. Paper for ACORN-REDECOM [Americas Communication Research Network- Red Americana de Investigación e Información y Comunicación]

In addition to the reduction of input costs, extension of the budget telecom network model will be essential. Flat-rate pricing models are not appropriate for poor people with irregular incomes. They will buy broadband access the same way they buy voice telephony and shampoo today, in small prepaid increments as and when money becomes available and the needs arise.

Broadband is currently on offer in prepaid form in South Asia.³⁸ Interestingly, prepaid offers tend to come from mobile providers using HSPA/HSDPA, rather than from fixed broadband (ADSL or WiMAX) operators. The vexed questions related to “net neutrality”³⁹ take a different complexion in the mobile setting. Almost by definition, one cannot provide the identical Internet experience to those connecting through mobile networks, fixed, nomadic or mobile.⁴⁰ The very fact that variable numbers of users are accessing the base station results in variable quality of service experience (QoSe). More so than in fixed networks which may be dimensioned to accommodate fixed numbers of users for components of the access network, users of broadband services offered by mobile operators tend to be subject to rationing rules that are automatically applied depending on demand, including 3G geographical coverage areas that contract when demand from a specific BTS [Base Transceiver Station] is heavy. In addition, the concept of “always on” has limited applicability to users of broadband services offered by mobile operators.

The model rests on aggregating small amounts of use in ways that will absorb a high proportion of the available capacity, rather than on the obsolete and misleading concept of average revenue per user (ARPU).⁴¹ With individual users connecting

³⁸ E.g., http://www.mobitel.lk/support/3g_delight.html

³⁹ <http://lirneasia.net/2006/05/net-neutrality-implications-for-emerging-asia/>

⁴⁰ Fixed means that one connects to the network from one location all the time, using a “dongle” or a netbook with a built-in antenna. Nomadic means that at the moment of connecting the user is stationary, though she connects from multiple locations, again, usually from a dongle-equipped laptop or a netbook. Mobile means that the user is on the move while connecting. Here, it is likely that the user connects through a handset, though netbooks or even laptops may be used in moving vehicles.

⁴¹ The accurate term could be average revenue per customer (ARPC), because that is what is actually counted. But now, in mobile markets where many customers are using multiple active SIMs, the term should be average revenue per active SIM (ARPAS).

from their handsets, netbooks, laptops or desktops, the key is keeping transaction costs (e.g., customer acquisition costs, billing costs) to a minimum. Another way of achieving the same result is to have lots of low-volume users connecting to the Internet from common-use facilities such as telecenters and cybercafés. The earlier thinking that rested on fixed connections such as ADSL or VSAT links for telecenters is increasingly being replaced by a focus on connectivity supplied by mobile operators, HSPA or even 2.5G connections.⁴² This shifts the debate from a mobile-versus-telecenters frame to a mobile-and-telecenters frame.⁴³

Teleuse@BOP qualitative research shows that low-income users are indeed using the cybercafés and mobiles in complementary ways, downloading music in cybercafés, transferring the content to mobiles using Bluetooth and then listening to the music from the handset.⁴⁴

The Teleuse@BOP3 survey specifically probed awareness, trial and use of “more-than-voice” services over the mobile. The levels of awareness, trial and use, especially among the lower SEC groups in Pakistan, India and Bangladesh (the Indo-Gangetic Plain, constituting the hardest case) were generally low. Awareness, trial and use were low even for services such as premium-SMS-based voting for American Idol-type reality shows in the Southeast Asian countries and in Sri Lanka. (Figure 8 and Figure 9) This was unsurprising, because these services are just being developed and the business models for serving the poor are yet being worked out.

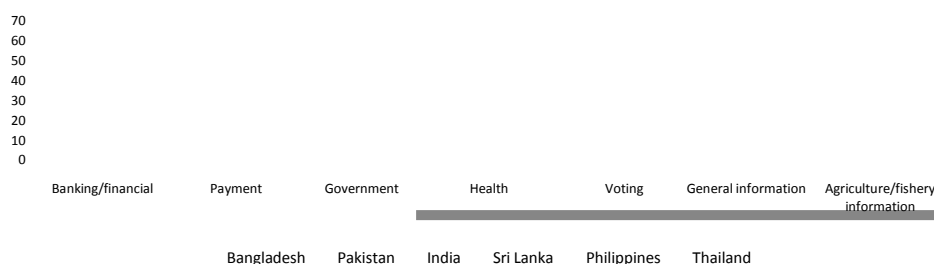


Figure 8: Awareness of Mobile2.0 services at the BOP (% of SEC D and E teleusers)

Source: LIRNEasia (2009) Teleuse@BOP3. Survey findings

⁴² GSMA (2009, January). *How to realize the benefits of mobile broadband today. A public white paper*, section 5. Retrieved July 28, 2009 from <http://hspa.gsmworld.com/upload/news/files/13022009113831.pdf>; Grameen Telecom (n.d.). *CIC and GIK*. Retrieved July 28, 2009 from http://www.grameentelecom.net.bd/gik_cic.html (case of 2.5G use)

⁴³ Samarajiva, R. (2009, April-June). PCs are not the best vehicles for providing IT-delivered services to rural areas, *Telecentre Magazine*: 30, 32. <http://lirneasia.net/wp-content/uploads/2009/08/Telecenter.pdf>

⁴⁴ CKS Consulting Pvt. Ltd. (2009). *Teleuse@BOP3: A Qualitative Study*. Colombo: LIRNEasia (pp. 111-112). Retrieved July 28, 2009 from <http://lirneasia.net/wp-content/uploads/2008/04/qualitativereport.pdf>

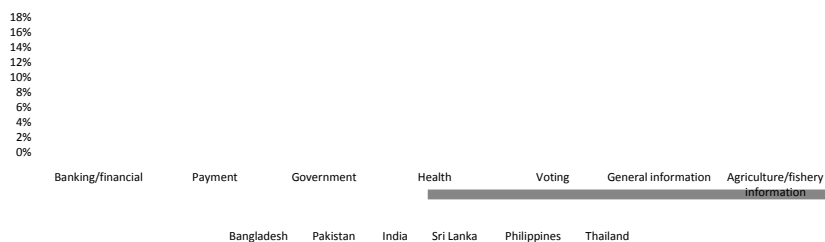


Figure 9: Use of Mobile2.0 services at the BOP (% of SEC D and E teleusers)

Source: LIRNEasia (2009) Teleuse@BOP3. Survey findings

However, the uniformly higher levels of awareness, trial and use among the younger users suggest that there is considerable potential (Figure 10). The survey also found variable degrees of readiness to try different services among the current teleusers (Figure 11).

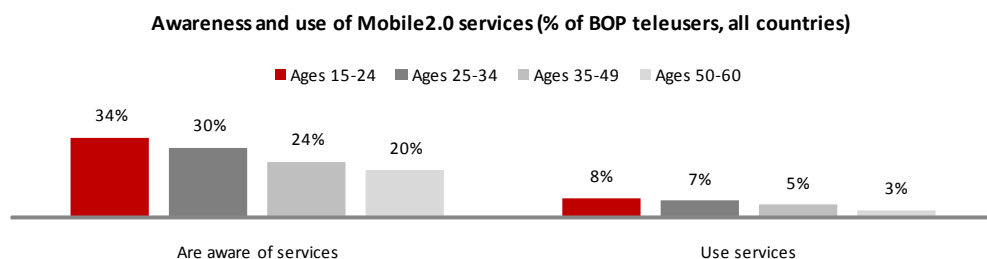


Figure 10: Awareness and use of Mobile2.0 (more than voice) services (% of SEC D and E teleusers, all countries)

Source: LIRNEasia (2009) Teleuse@BOP3. Survey findings



Figure 11: Willingness to try accessing payment, government or agriculture/fishery information services through a mobile (% of SEC D and E teleusers who are currently unaware of such services)

Source: LIRNEasia (2009) Teleuse@BOP3. Survey findings

It is increasingly becoming clear that agricultural information is better provided on the almost-ubiquitous mobile that provides information when and where users want it, rather than in distant kiosks with opening and closing hours or even in homes. Findings from the Warana Wired (old and failing; centered on common-use computers) and Warana Unwired (new and successful; centered on mobiles) projects in Maharashtra,⁴⁵ now being applied on a larger scale in Vietnam by Microsoft Research,⁴⁶ vividly illustrate this.



Figure 12: Maharashtra farmer accessing agricultural information through Warana Unwired services on a mobile phone

Source: Toyama, K. (2008). Warana Unwired: With an examination of rural PC kiosks [Presentation slides]. Retrieved August 2, 2009 from http://www.tcs-trddc.com/Tecs%2708/KT_Warana%20Unwired.ppt

Companies such as CellBazaar in Bangladesh are introducing e-commerce to BOP users who would otherwise never get access to such services. CellBazaar is designing its services for the highly constrained capabilities of the cheapest, simplest 2G GSM phones on the market and is therefore focusing only on the search phase of the transaction (Figure 13).

⁴⁵ Veeraraghavan, R., Yasodhar, N., and Toyama, K. (2009). Warana Unwired: Replacing PCs with mobile phones in a rural sugarcane cooperative, *Information Technologies and International Development*, 5(1): 81-95

⁴⁶ Personal communication from Kentaro Toyama of Microsoft Research, June 3, 2009.

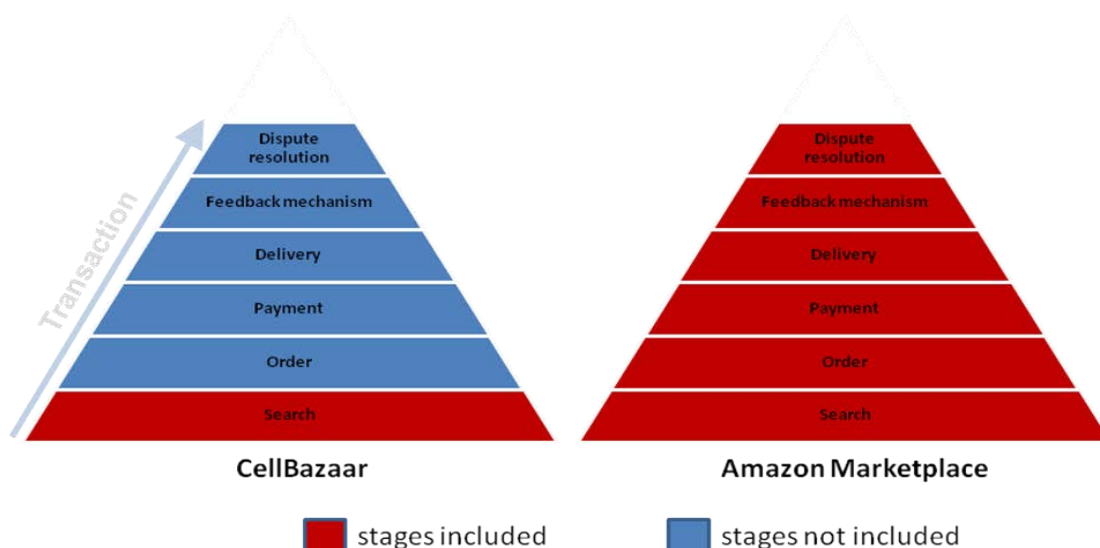


Figure 13: Stages of a commercial transaction included in CellBazaar compared with Amazon Marketplace

Everything else takes place outside the CellBazaar system, but using the conversational and messaging capabilities of mobile phones. Analysis shows that the enterprise is still in the promotional phase, seeking to attract users at low prices (around a minimum of USD 0.35 for a transaction) and sacrificing high returns. The rather clumsy user experience through the familiar SMS format is being improved through WAP [Wireless Access Protocol], in the case of CellBazaar and may be improved by others using the USSD [Unstructured Supplementary Services Data] functionality that is also part of GSM.

As with the sugarcane farmer who can obtain market information when he wants it, even while on a tractor, the mobile interface in CellBazaar has inherent additional benefits with regard to transactions that cannot be completed fully on the web (e.g., purchase of a used car or a cow). Unlike comparison shopping on a desktop that requires the taking of notes or printouts before venturing out for actual transactions, the mobile interface allows comparison shopping on an as-needed, when-needed basis.

The Govi Gnana Seva (GGS) system for delivering agricultural market prices in Sri Lanka has gone through many incarnations in its short life since 2002.⁴⁷ First, it focused on collecting spot-prices from Sri Lanka's largest fruit and vegetable wholesale market and displaying the prices of large electronic screens intending to reduce price dispersion within the market itself. Then, it sought to deliver spot prices to those who were distant from the market through SMS and an interactive voice response (IVR) system. During a period of scaling down and rethinking, the prices were collected and disseminated over radio and television. Starting in 2009, the system is being redesigned to deliver spot and rudimentary forward prices to

⁴⁷ de Silva, H. (2009, July 16). ICT policy for agriculture in Sri Lanka: Some thoughts, in *Proceedings of the Joint National Conference on Information Technology in Agriculture* (pp. 34-43). Moratuwa and Matara (Sri Lanka): University of Moratuwa and University of Ruhuna

mobile phones.⁴⁸ Delivery of forward and spot prices to the mobile device allows for a whole range of behaviors that would not be possible if they were delivered only to desktops in telecenters or elsewhere. Here the mobile can be used directly in negotiation, with additional information being pulled up by either party as needed, when needed.

The use of mobiles in reducing friction from fish markets in Kerala, India and in grain markets in Niger have been well studied. In both cases, it was found that producer prices increased, consumer prices decreased and waste was eliminated (in the case of the perishable commodity, fish) because producers ranged over a larger number of hitherto isolated markets that were newly connected through mobiles. In contrast with some of the above examples, the Kerala and Niger cases do not involve any kind of organized data collection, but simply the use of mobiles for information gathering and decision making by individual market actors.⁴⁹

Mobiles are attracting considerable attention as payment devices, especially for the poor.⁵⁰ Clearly, payment is one of the more complex functions performed on the Internet and in combination with other functions can yield higher-level participation in the Internet Economy. In particular, there is interest in the use of mobiles in facilitating remittances by temporary migrant workers.

LIRNEasia research shows that compared to Pakistani, Indian, Sri Lankan and Filipino overseas migrant workers, Bangladeshi overseas migrants called home most frequently: 87 percent of Bangladeshi overseas migrants surveyed called home *at least* once a week, while 34 percent called home daily. The survey found that on average, Bangladeshis also paid the most for communication with family and friends back home, spending USD 48 per month to keep in touch, as against USD 15 by Indians.

The Bangladeshi migrants mostly work West Asia and East/Southeast Asia. On average, they earned approximately USD 485 a month, of which USD 203 was sent home. The most popular way of communicating home was by telephone, though

⁴⁸ <http://www.lirneasia.net/wp-content/uploads/2009/07/harsha.de.silva.pdf>

⁴⁹ Jensen, R. (2007). The digital divide: Information (technology), market performance, and welfare in the South Indian fisheries sector. *Quarterly Journal of Economics*. Vol. CXXII(3): 879-924; Aker, J.C. (2008). Does digital divide or provide? The impact of cell phones on grain markets in Niger. Unpublished job paper. Retrieved August 2, 2009 from <http://are.berkeley.edu/~aker/cell.pdf>

⁵⁰ Alampay, E. and Bala, G. (2009) *Mobile 2.0: m-money for the unbanked*. Working paper presented at LIRNEasia colloquium, Colombo, June 30, 2009; BBC (2009, June 15). Africa pioneers mobile bank push. Retrieved August 2, 2009 from <http://news.bbc.co.uk/2/hi/technology/8100388.stm>; Boyd, C and Jacob, K. (2007). Mobile financial services for the underbanked: Opportunities for mbanking and mpayments. Chicago: Center for Financial Services Innovation. Retrieved August 2, 2009 from <http://www.cfsinnovation.com/document/mbanking.pdf>; Vodafone (2007). The transformational potential of m-transactions. Vodafone Policy Paper. Retrieved August 2, 2009 from <http://www.ictregulationtoolkit.org/en/Document.3437.pdf>; Wishart, N. (2006). Micro-payment systems and their application to mobile networks: Examples of mobile-enabled financial services in the Philippines. Washington DC: infoDev Retrieved August 2, 2009 from <http://www.infodev.org/en/Publication.43.html>

unlike the other nationalities, a significant number (28 percent) also made calls through the Internet.

Bangladeshi domestic migrants appeared to be making the most use of mobiles to send money home. While hand-carrying of cash was the most popular way of remitting money, a small but significant number sent money home through mobiles, despite the lack of a formal mobile payment system in the country. They are making use of systems like the “flexi-load” (whereby one customer can transfer value to another’s prepaid account) to transfer money home. Often migrants keep good relations with the village flexi-load seller who “cashes out” the value of load transfers from the migrant to his family (less the commission, which may be as high as 20 percent or as low as zero). Ironically, in the Philippines, the only country in the study where mobile remittance services are currently legal, fewer migrants used

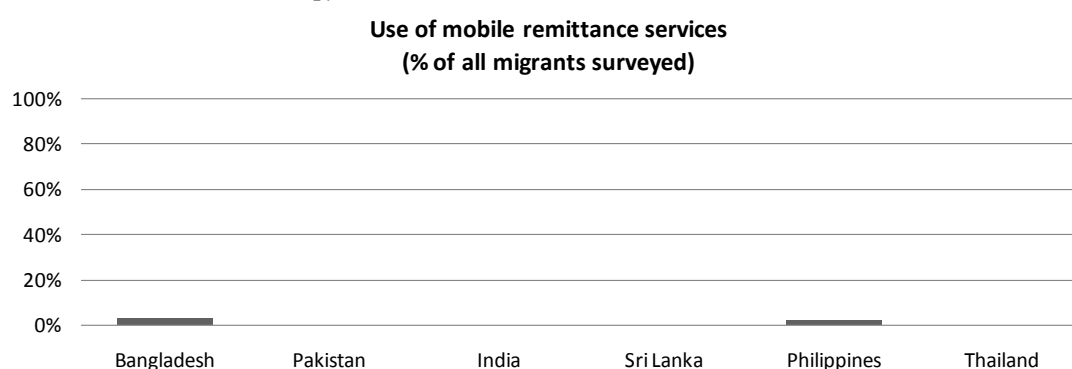


Figure 14: Use of mobile remittance services (% of SEC D and E migrant workers)

Source: LIRNEasia (2009). Teleuse@BOP3 migrant worker study. Survey findings.

As more-than-voice applications and services become widely available on mobile platforms, it is reasonable to expect that the use of mobiles for more-than-voice will increase, giving large numbers of poor people experience with functionalities today commonly associated with static desktops connected to broadband pipes. As these uses increase, we can also expect the demand-pull for 3G—and-beyond network standards more conducive to satisfactory mobile web experiences to become stronger and for supply to become ubiquitous. As the mobile pathway to the Internet becomes increasingly well-trodden, we can also expect the complementary uses of the conventional pathway to increase from users who wish to print or scan documents or pictures and those who wish to use bigger screens and keypads for particular tasks.

4.0 Internet/telecom access and wealth creation through service industries

⁵¹ LIRNEasia (2009). Teleuse by the Bangladeshi migrant worker. [Presentation slides]. Retrieved August 2, 2009 from <http://lirneasia.net/2009/06/teleusebop-migrant-study-findings-to-be-released-in-dhaka/>; *The Daily Star* (2009, June 26). Bangladeshi migrants call home more frequently: survey (p. B3); *The Financial Express* (2009, June 29). Calling home means a lot to Bangladeshi expat workers (p. 8); *The New Nation* (2009, July 1) Migrants use mobiles to remit money to families (p. 6)

The service sector has always been a residual category that included all that did not belong in agriculture (including fishing and mining) and manufacturing.⁵² Therefore, the large and generally increasing size of service sectors in developing economies cannot, per se, be taken as evidence that they are developing in ways that will move large number of people out of poverty. Nevertheless, the service sector does play an important role in absorbing excess labor from the agricultural and manufacturing sectors as they become more productive.

The knowledge sector is a subsector within the service sector. Its end-product is knowledge. Examples are education, research, and software. This subsector relies greatly on ICTs, but in fact the role of ICTs in contributing to wealth creation is not limited to this subsector, but extends across the entirety of services, manufacturing and agriculture. They play a foundational role in the emergence of a knowledge-based economy, where innovation based on systematic application of knowledge occurs in all sectors. Without ICTs, it would be difficult or impossible to codify knowledge and transmit it in a range of forms and scale at low cost. The basic argument regarding access to the Internet and telecom networks contributing to wealth creation is anchored on the access to knowledge that is made possible and the reductions of the frictions of time and space that can be realized.⁵³ Access to ICTs does not per se result in wealth creation. It is a foundational element along with governance and financial infrastructure. Without education/skills, investment and innovation, the desired results cannot be achieved. Access to ICTs is a necessary condition, but not a sufficient one.⁵⁴

The fact that access to ICTs is complementary makes the establishment of causal links to development outcomes difficult, though there have been several attempts, each with its own shortcomings.⁵⁵ At the macro level, Solow famously said that “You

⁵² Maddison, A. (2004, March). Quantifying and interpreting world development: Macromasurement before and after Colin Clark, *Australian Economic History Review*, 44(1): 1-34. Longer version retrieved 20 August 2009 from http://www.ggdc.net/maddison/articles/colin_clark.pdf

⁵³ World Bank. (1999). *World Development Report 1998/99. Knowledge for Development*. New York: Oxford University Press.

⁵⁴ Samarajiva, R. and A. Zainudeen (Eds.) (2008), Introduction. What is . . . and what could have been . . . , in *ICT infrastructure in Emerging Asia: Policy and Regulatory Roadblocks*. (pp. 19-20). New Delhi & Ottawa: SAGE & IDRC.

⁵⁵ Cronin, F. J., E. K. Collieran, E. B. Parker and M. A. Gold (1991). Telecommunications infrastructure and economic growth: An analysis of causality. *Telecommunications Policy* 15(6): 529-535; Cronin, F. J., E. K. Collieran, E. B. Parker and M. A. Gold (1993). Telecommunications infrastructure investment and economic development. *Telecommunications Policy*, 17(6): 415-430. Hardy, A. P (1980). The role of the telephone in economic development. *Telecommunications Policy* 4(4): 278-286; Parker, E.B, H.E. Hudson, D.A. Dillman, S. Strover and F. Williams (1995) *Electronic byways: State policies for rural development through telecommunications*, 2nd ed. Washington DC: Aspen Institute; Waverman, L., M. Meschi and M. Fuss (2005). The impact of telecoms on economic growth in developing countries. In *Africa: The impact of mobile phones in the developing world. Moving the debate forward*, The Vodafone Policy Paper Series 3(March 2005): 10-23, retrieved November 2, 2005 from http://www.vodafone.com/assets/files/en/SIM_Project_download_2.pdf. See also review of related work in Waverman, L. and Dasgupta, K. (2009). How to maximize the economic impact of mobile communication: The four waves, in Dutta, S. and Mia, I. (eds.) *Global Information Technology*

can see the computer age everywhere but in the productivity statistics.”⁵⁶ There are those who argue that there was a need to factor in a time lag and there are studies that show the contribution.⁵⁷ In the specific context of economic development, the World Bank made a magisterial effort in 1999 to establish the case.⁵⁸

At the micro level, case studies and studies abound. Perhaps the most rigorously argued micro study is that of producer prices, consumer prices and waste in a number of adjacent but previously independent fish markets along the coast of the Indian state of Kerala before and after the arrival of mobile phones.⁵⁹ This natural experiment clearly established that both consumers and producers benefited and the markets cleared (eliminating waste) because the fishermen called multiple fish markets while still at sea and went to the one offering the best price. It was reported that in contrast to all the boats returning to the home harbor prior to mobiles, 35 percent sold their catch at a harbor other than the one they set off from after the mobiles arrived. Jensen assumed the diversion to be costless. Aker, in a subsequent study of grain trade in Niger, factored in transport costs and distance and arrived at similar conclusions.⁶⁰

In the same way that it took the best economists and statisticians working with high-quality data more than a decade to establish the contribution of ICTs to productivity in the US economy, it will take substantial effort to make the case in the developing world.

The significance of access to telecom and the Internet in generating wealth can be discussed also in relation to its role in making services tradable. There are four accepted modes of services trade, as set out in the General Agreement on Trade in Services (GATS):

1. Mode 1, where the seller remains in Country A and the buyer remains in Country B and trade takes place. This is most like trade in goods.
2. Mode 2, where the buyer travels to Country A where the seller is. The trade occurs in Country A.
3. Mode 3, where the seller in Country A establishes a non-natural person (a company) in Country B to supply services to customers in Country B. The

Report 2008-09, Mobility in a networked world, pp. 53-63. Geneva: World Economic Forum and INSEAD.

⁵⁶ Solow, R.M. (1987). We’d better watch out. *New York Times Book Review* (July 12): 36.

⁵⁷ David, P.A. (1990). The dynamo and the computer: A historical perspective on the modern productivity paradox, *American Economic Review Papers and Proceedings*: 355-61; and Brynjolfsson, E., and S. Yang (1999, December). The intangible costs and benefits of computer investments: Evidence from the financial markets. MIT Sloan School of Management.

⁵⁸ World Bank. (1999). *World Development Report 1998/99. Knowledge for Development*. New York: Oxford University Press.

⁵⁹ Jensen, R. (2007). The digital provide: Information (technology), market performance, and welfare in the South Indian fisheries sector. *Quarterly Journal of Economics*. Vol. CXXII, Issue 3: 879-924

⁶⁰ Aker, J.C. (2008). Does digital divide or provide? The impact of cell phones on grain markets in Niger. Unpublished job paper. Retrieved August 2, 2009 from <http://are.berkeley.edu/~aker/cell.pdf>

trade occurs in Country B. This may or may not involve the movement of natural persons from Country A to Country B.

4. Mode 4, where natural persons from Country A travel to Country B to supply services to buyers in Country B. This may occur in conjunction with Mode 3 trade or independently.

In many developing countries, the principal mode of services trade is Mode 4, wherein skilled and unskilled workers travel to labor-shortage countries for varying periods to sell their services and remit the earnings back home. Beyond the social problems caused by family separations (particularly among the low-skilled, only the worker is given a visa), the home economies also do not get the all the spin-off benefits of having large workplaces and wage earners in their territories. In addition Mode 4 trade is generally not subject to any forms of rule-based regimes and thus tend to be unfavorable to the powerless, especially the migrant workers.⁶¹ Mode 3, even though resisted by nationalists and protectionists to some extent, brings the large workplaces closer to the buyers of services, though they do not provide as many employment opportunities as does Mode 4.

Mode 1 has the greatest promise in terms of alleviating the negative aspects of Mode 4, while still allowing the export of services. It allows firms and workers in Country A to sell to Country B without physically moving to Country B. It is possible only because of ICTs, in particular cheap and reliable leased lines. Here, the workers do not have to separate themselves from families for long periods and the money they and the firms which employ them generate circulate in the local economy, creating further wealth. Workplaces and worker movements do create pressure on infrastructure, but the long-term result is generally the building of adequate infrastructure that benefits more than the service-export companies.⁶²

More than developing service industries to serve the local market, the ICT-enabled service industries that export their services create wealth and pull more people out of poverty. Of course, the modern business practices that allow for differentiation of functions and the outsourcing of non-core activities will then seep into the domestic economy as well, creating the conditions for inshoring, as opposed to offshoring or the export of services. This results in the domestic firms also becoming more efficient and/or customer responsive and jobs being created away from the major urban agglomerations.

Both offshoring and inshoring have been flourishing in Southern and Western India, since the 1990s. It is generally accepted that these regions make a disproportionate contribution to the Indian economic growth story. Unpacking the specific contributions of service trading made possible by ICTs and various other factors such

⁶¹ Jackson, J.H. (1997). *The world trading system: Law and policy of international economic relations*, 2nd edition. Cambridge, MA: The MIT Press

⁶² Vijayabaskar, M. and Krishnaswamy, K. (2004). Understanding growth dynamism and its constraints in high-technology clusters in developing countries: A study of Bangalore, Southern India. Working group paper. http://www.eadi.org/fileadmin/WG_Documents/Reg_WG/vijayabaskar.pdf, retrieved August 20, 2009.

as the demographic dividend⁶³ is beyond the scope of this report. It would, however, suffice to say that the growth of the organized and export-oriented service industries made possible by ICTs has made a significant positive contribution to India's recent spurt in economic growth and the resultant escape from poverty by large numbers of Indians.

5.0 Policy and regulation conducive to the Internet Economy

The traditional conception of policy and regulation derives the policy framework and regulatory instruments from the theory of public administration, with contributions from explicit or implicit theories of the state. In the case of developing countries, the state was seen as lacking in certain elements or attributes. For example, it lacked adequate respect for the sanctity of contract. Case after case, investors would be given promises and assurances based on which they would make investments. Once the investments were in the ground and their negotiating power atrophied, the assurances would be cast to the wind and outright or administrative expropriation would take place. Investment insurance was seen as a remedy, as was the creation of sector-specific regulatory agencies and regimes to govern specific industries, especially those in infrastructure that were especially vulnerable to administrative expropriation.⁶⁴

The tendency was to import regulatory regimes and practices from developed market economies, especially those created by the ownership and regulatory reforms of the 1980s in the UK and the USA by pro-private-sector governments. However, early in the process, scholars pointed out the need to align regulatory solutions with the institutional conditions of the host countries.⁶⁵ Given one of the special attributes of the state in developing countries, its lack of capacity for effective reforms, external expertise was brought in to advise on transactions (where the results were not too bad) and on the design of new policy and regulatory frameworks and instruments (where the result tended to be the wholesale transplantation of developed-economy frameworks and instruments). Over time and at considerable cost the frameworks and instruments are being adapted to local conditions, though in many cases the adaptations take pathological forms consonant with some of the less pleasant aspects of state formation in the developing world.⁶⁶

The surprising thing, despite all these mistakes, is that the telecom infrastructure has expanded greatly and more than three billion people who were excluded during the

⁶³ Nilekani, N. (2008). *Imagining India: The idea of a renewed nation*. New York: Penguin.

⁶⁴ Samarajiva, R. (2002). Why regulate? In International Telecommunication Union, *Effective regulation: Trends in telecommunication reform*, 4th edition. Geneva: International Telecommunication Union.

⁶⁵ Levy, B. and Spiller, P.T. (1994). The institutional foundations of regulatory commitment: A comparative analysis of telecommunications regulation. *Journal of Law, Economics, and Organization*, 10(2).

⁶⁶ Khan, M. (2005). The capitalist transformation. In, K.S. Jomo and E.S. Reinert (eds.), *The origins of development economics: How schools of economic thought have addressed development* (pp. 69-80). London and Chennai: Zed Press and Tulika Press.

government-owned integrated monopoly era are now connected to electronic networks, even in countries with no functioning regulatory agencies and the most rudimentary policy frameworks. Of course, there are the cases of the low-mobile countries, led by North Korea and Burma/Myanmar, where nothing seems to have worked. Among this group, several such as Eritrea, Ethiopia, Papua New Guinea and Turkmenistan are now showing rapid growth from low bases (Table 4). The conclusion that has to be drawn is some degree of market entry is necessary for the market dynamics to get started. Timor Leste, for example, made the mistake of granting a 15 year monopoly over all telecom services to Portugal Telecom in 2002 and is suffering the consequences. The uniformly lower growth rates on the fixed side also support the thesis that market entry to at least a few suppliers is a necessary condition for rapid growth.

Table 4: Low-mobile-penetration countries, excluding micro states

	Active SIMs, 2003 ('000)	Active SIMs, 2008 ('000)	CAGR, 2003- 08 (%)	Active SIMs/100
DPR Korea	-	-	-	-
Myanmar	66.5	375.8	41.4	0.76
Eritrea	-	108.6	-	2.2
Cuba	35.4	331.7	56.5	2.96
Ethiopia	51.3	3,168.3	128.1	3.93
Papua New Guinea	17.5	300	103.5	4.67
Burundi	64	480.6	49.7	5.95
Turkmenistan	9.2	347.6	148	6.98

Source: ITU (2008). ICT statistics database. Retrieved from <http://www.itu.int/ITU-D/icteye/Indicators/Indicators.aspx>

Note: CAGR: compound annual growth rate. No data reported for DPR Korea. Its 3G License was issued in 2008

Table 5: Fixed performance of low-mobile countries, excluding micro states

	Fixed lines, 2003 ('000)	Fixed lines, 2008 ('000)	CAGR, 2003- 08 (%)	Fixed/100, 2008
DPR Korea	980	1180	4.8	4.97
Myanmar	363	708.9	18.2	1.44
Eritrea	38.1	40.4	1.2	0.82
Cuba	724.3	1103.6	8.8	9.85
Ethiopia	404.8	908.9	17.6	1.13
Papua New Guinea	62.9	60	-1.2	0.93
Burundi	23.9	30.4	4.9	0.38
Turkmenistan	376.1	457.9	5	9.2

Source: ITU (2008). ICT statistics database. Retrieved from <http://www.itu.int/ITU-D/icteye/Indicators/Indicators.aspx>

The conclusion that may be drawn therefore is that market entry that allows at least a few suppliers in (even as few as two in micro states) is the necessary condition for rapid growth of access to telecom services of all kinds and thereby for participation in the global Internet Economy. Competition strong enough to cause the operators

to adopt the budget telecom network model is the sufficient condition, at least for low-income countries. This qualification has to be inserted because countries such as China and South Africa have achieved high levels of mobile penetration (though not low prices and high minutes of use, as in South Asia) without necessarily adopting the budget telecom network model.⁶⁷

The question then is what policy frameworks and regulatory instruments are conducive for participation in the global Internet Economy by developing countries? The short answer is those that are hostile, to a greater or lesser degree, to market entry barriers and are supportive of the budget telecom network model.

Market entry and spectrum management

In light of the absolute necessity of spectrum for building access networks for voice and data in developing countries, it is meaningless to talk about market entry in the abstract. Except in the case of specialized services such as international gateways, for the most part most telecom service suppliers require frequencies, mostly for access networks, but also in some cases for backhaul.

To the degree that market entry and spectrum assignment are based on clearly announced policy frameworks and transparent procedures, consistent with the provisions in the Reference Paper that forms part of Protocol 4 of the General Agreement on Trade in Services (GATS), it is very good. However, market entry that is not based on prior-announced policies and transparent procedures is still better than no market entry. Bangladesh, a country that arguably failed to meet standards of good practice on market entry in the past has nevertheless succeeded in connecting over 40 percent of its SEC D and E population to mobile networks and offers the world's second-lowest mobile prices.⁶⁸

Even if operators can muddle through with poor spectrum management and opaque assignment in the early stages, there will be problems as the networks expand and more new services are offered if spectrum management, especially refarming, is not done professionally and transparently.⁶⁹ Delays in releasing 3G frequencies in many countries, including in important markets such as India, have already caused harm to their participation in the Internet Economy.

⁶⁷ The McKinsey contributors to Dutta, S. and Mia, I. (eds.) *Global Information Technology Report 2008-09, Mobility in a networked world*. Geneva: World Economic Forum and INSEAD make the mistake of seeing China and the Philippines, countries that started the reform process very early as models for the entire developing world. The Budget Telecom Network model emerged in South Asia only in the past few years and is now diffusing to other regions.

⁶⁸ LIRNEasia (2009, February). Mobile benchmarks: South Asia. Retrieved August 2, 2009 from <http://lirneasia.net/wp-content/uploads/2007/08/09-02-sa-baskets-explained-v1-0.pdf>; Nokia. (2009). Affordability key in bringing digital inclusion. *Expanding Horizons* (Quarter 1 2009) (pp. 10-12). Retrieved from <http://expandinghorizons.nokia.com/issues/?issue=ExpandingHorizonsQ12009>

⁶⁹ Samarajiva, R. (2006). Preconditions for effective deployment of wireless technologies for development in the Asia-Pacific, *Information Technology and International Development*, 3(2): 57-71. <http://itidjournal.org/itid/article/view/224/94>

Interconnection

In the early days of regulation, most experts answered “interconnection, interconnection and interconnection” when asked for the top three priorities of regulation. When one sets regulatory priorities in terms of the Budget Telecom Network model, market entry and spectrum management emerge as the highest priorities.

Research on customer behavior has shown that there are workarounds for imperfect interconnection. The refusal of the incumbent fixed operator in Bangladesh to offer interconnection to the mobile operators and the failure of the regulator to compel interconnection did not prevent the people of Bangladesh from getting connected to mobile networks at a CAGR of over 100 percent in the past few years⁷⁰ and from enjoying some of the lowest prices in the world. Furthermore, there is an increasing tendency for customers to carry multiple SIMs, switching them on the same handset if not using them on dual-SIM handsets to keep most of their calls “on-net,” thereby enjoying the various discounts offered for friends and family calling within networks.⁷¹ This suggests that conventional interconnection is being worked around, at least by those who are willing to suffer the additional inconveniences of multiple SIM use.

This is not to say that cost-based interconnection is irrelevant. It is, especially in terms of reducing the differentials between on-net and off-net calls and the intended or unintended effects on illegal termination of international calls. Indeed, the oft-neglected aspect of interconnection, wholesale access to backhaul and essential facilities actually requires even more regulatory attention in light of the requirements of the budget telecom network model. As all other input costs get driven down, backhaul costs become even more significant.

Regulation of anti-competitive practices

This topic is one of the most important in the GATS Protocol Four Reference Paper. Yet, many policy and frameworks are full of lacunae in terms of enforcing prohibitions on anti-competitive practices and the regulatory instruments are blunt and crude. Again, as success in competitive marketplaces rests on ever thinner margins of cost differentials, the effects of anti-competitive practices such as cross-subsidies and tied sales become even more potent.

As firms increasingly offer bouquets of services, in some cases including entertainment offerings, there is a need to ensure that cross subsidization does not get out of control. As retail prices keep getting driven down, the possibilities of anti-competitive vertical price squeezes grow larger. The success of the budget model

⁷⁰ ITU (2009). ICT statistics database. Retrieved from <http://www.itu.int/ITU-D/ict/ey/Indicators/Indicators.aspx>.

⁷¹ CKS Consulting Pvt. Ltd. (2009). Teleuse@BOP3: A qualitative study. Colombo: LIRNEasia. Retrieved July 28, 2009 from <http://lirneasia.net/wp-content/uploads/2008/04/qualitativereport.pdf>

rests on price flexibility as well as protection from tactics such as vertical price squeezes.

Tariff regulation

Old-style tariff regulation is not appropriate for the effective deployment of the budget telecom network model. In any case, price or revenue regulation is difficult to apply when each firm offers bundles of services measured in the tens if not hundreds. In practice, what is done is de facto forbearance, where all tariffs are more or less routinely approved, or at most asymmetrical regulation, wherein only the SMP [Significant Market Power] operator's tariffs are regulated. The weakness in this course of action is that SMP determinations and the resultant regulatory actions are extraordinarily complex and most developing country regulatory agencies are incapable of implementing them.⁷² The end result can be regulatory paralysis, to the unintended benefit of the incumbent operators.

Banded forbearance, where a country will choose to be benchmarked against prices of peer countries, is a possible solution.⁷³ Here, flexibility is allowed to all operators including the incumbent, within defined upper and lower bands set through benchmarking. If prices go below the lower band they will trigger a review based on stated competition-related criteria. The bands will be periodically readjusted based on external factors such as taxes or price movements in peer countries.

Quality-of-service regulation

In the same way that one does not expect silver tea service on RyanAir, one cannot expect premium service from budget telecom networks. All operators are likely to offer sub-optimal quality because of the need to squeeze as much traffic as possible into the network. Strict and aggressive QOS regulation is inimical to the model. However, it is also naïve to expect competition to prevent the operators from letting QOS fall to unacceptable levels.⁷⁴ Therefore, gentle supervision of QOS, focusing primarily on publishing QOS performance and ensuring that the barriers to unhappy customers switching suppliers are kept low, would be the most appropriate.

Universal service

The idea of making universal service transparent by creating universal service funds to replace the vague commitments to extend services to the un- and underserved through cross subsidies was a good idea in its time and was consistent with the

⁷² Gillwald, A. (2009, July 31). RIA rapid response for Bangladesh Telecommunications Regulatory Commission on significant market power. Retrieved August 2, 2009 from http://lirneasia.net/wp-content/uploads/2009/07/LIRNEasia_BangladeshSMP_Response_July2009.pdf

⁷³ Samarajiva, R. and Iqbal, T. (2009). Banded forbearance: A new approach to price regulation in partially liberalized telecom markets, *International Journal of Regulation and Governance*, 9(1): 19-40.

⁷⁴ Hirschman, A.O. (1970). *Exit, voice, and loyalty: Responses to decline in firms, organizations, and states*. Cambridge, MA: Harvard University Press.

provisions of the Protocol 4 Reference Paper. However, experience suggests that this is an idea that has run its course. Billions of dollars of universal service levies lie unspent in government accounts.⁷⁵ Where money has been disbursed, it has generally gone to fixed network operators, mostly incumbents. All the while, people in un- and underserved areas are being connected, not by the subsidized fixed line operators but by the mobile operators, whose poor customers are paying to support the inefficiencies of incumbents.⁷⁶ A strong case can now be made that universal service funds and levy percentages no longer satisfy the criterion of being “no more burdensome than necessary to achieve the defined universal service” and therefore are in violation of the commitments made under Protocol 4 of the GATS by many countries.

Evaluations of the telecom regulatory environments of several Asian countries across the dimensions discussed above were conducted by LIRNEasia in 2006 and 2008.⁷⁷ The key results for 2008 given in Table 6 show that informed stakeholders see much room for improvement in the TRE of all the countries studied, except in the micro state of the Maldives where it is believed that the limited number of informed stakeholders may have precluded candid answers.

Table 6: Final scores for 2008 TRE studies in eight countries: Mobile sector

	Bangladesh	India	Indonesia	Maldives	Philippines	Sri Lanka	Thailand	Pakistan
Market entry	3.1	3.1	3.0	3.8	3.2	2.8	2.7	3.9
Access to resources	2.8	2.2	2.7	3.6	2.8	2.7	2.6	3.6
Interconnection	3.3	2.8	2.7	3.5	2.8	2.6	2.6	3.7
Tariff regulation	3.5	3.9	2.6	3.4	2.8	2.7	2.9	3.2
Anti-competitive practices	3.1	2.7	2.5	3.1	2.5	2.7	2.6	2.8
Universal service obligations	2.4	3.1	2.1	3.5	2.6	3.0	2.6	3.2
Quality of service	3.2	2.8	2.3	3.8	3.1	2.9	3.1	3.2

Taxation

Taxation was not included in the WTO Reference Paper and was almost routinely ignored in discussions of telecom regulation until recently. This is no longer possible because the taxation tail has begun to wag the regulatory dog. In some cases, the only way to understand a particular policy or regulatory action is to see that taxation is the principal purpose and the provision of telecom services is secondary.

⁷⁵ Samarajiva, R. (2008, October 12). Bangladesh doesn't need a universal service tax, *Daily Star*, retrieved on 20 August 2009 from <http://www.thedailystar.net/story.php?nid=58271>

⁷⁶ Malik, P. (2008). Universal service obligations: To incumbents. In R. Samarajiva and A. Zainudeen (Eds.), *ICT infrastructure in Emerging Asia: Policy and Regulatory Roadblocks* (pp. 216-39). New Delhi & Ottawa: SAGE & IDRC

⁷⁷ <http://lirneasia.net/projects/2008-2010/indicators-continued/telecom-regulatory-environment/>, retrieved August 20, 2009.

Studies conducted by the industry lobbyist body, the GSM Association (GSMA) show that for every 100 units of currency spent on mobile service, as much as 44 percent may be extracted as tax (including license fees, spectrum fees, universal service obligations, equipment import levies, sales tax etc.), with the operator acting as tax collector (Figure 15). This is obviously inimical to the effective operation of the budget telecom network model. Some taxes such as handset and SIM taxes are regressive and constitute entry barriers mostly to the poor. Kenya is an exception in reducing such taxes recently.⁷⁸

⁷⁸ The Economist (2009, June 18). East Africa gets broadband: It may make life easier and cheaper. *The Economist*.
http://www.economist.com/research/articlesBySubject/displayStory.cfm?story_id=13876700&subjectID=348963&fsrc=nwl

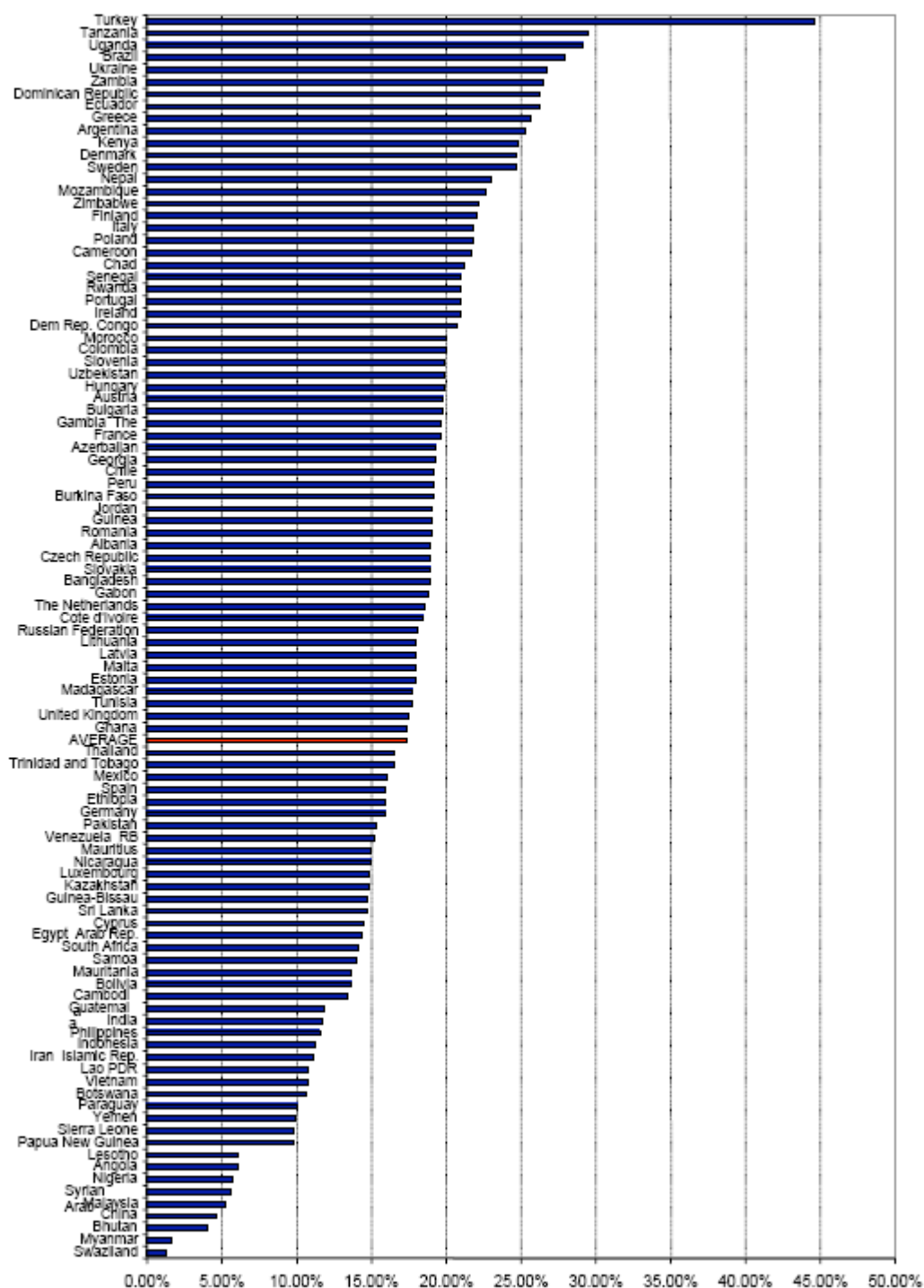


Figure 15: Tax as a total share of cost of mobile ownership

Source: Deloitte (2007). Global mobile tax review: 2006-2007. London: GSMA. Retrieved August 7, 2009 from http://www.gsmworld.com/documents/tax_review_06_07.pdf

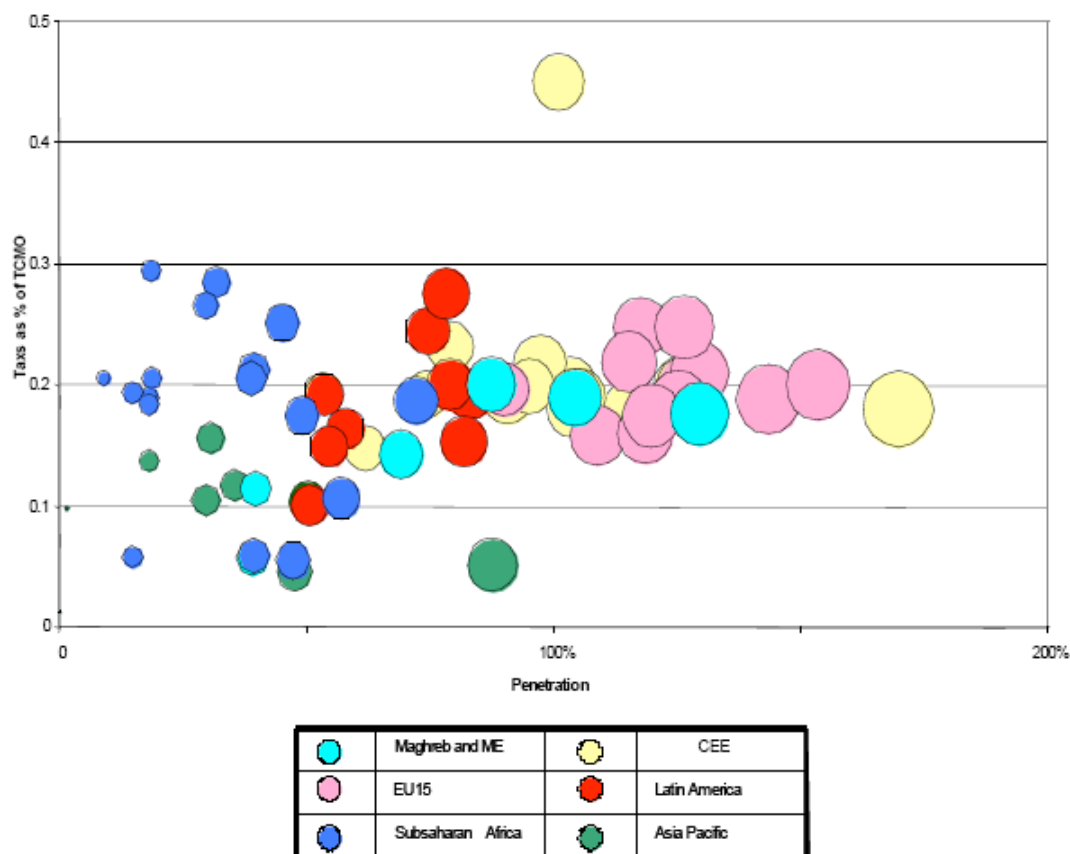


Figure 16: Tax as a percentage of TCMO and penetration

Source: Deloitte (2007). Global mobile tax review: 2006-2007. London: GSMA. Retrieved August 7, 2009 from http://www.gsmworld.com/documents/tax_review_06_07.pdf

Studies of user behavior and attitudes among SEC groups D and E in South and Southeast Asia showed that customers are not aware of the tax burdens imposed on them (Figure 17). One does wonder what the penetration levels would be if taxes other than those imposed on all goods and service such as VAT are lifted. The GSMA has done some modeling that shows that this may even increase government revenues because the base increases due to price elasticity. Though the goal of lifting all telecom-specific taxes is somewhat unrealistic, this is an area where further research can serve public policy goals of increasing connectivity as well as ensuring adequate revenues for the government from a dynamic sector of the economy.

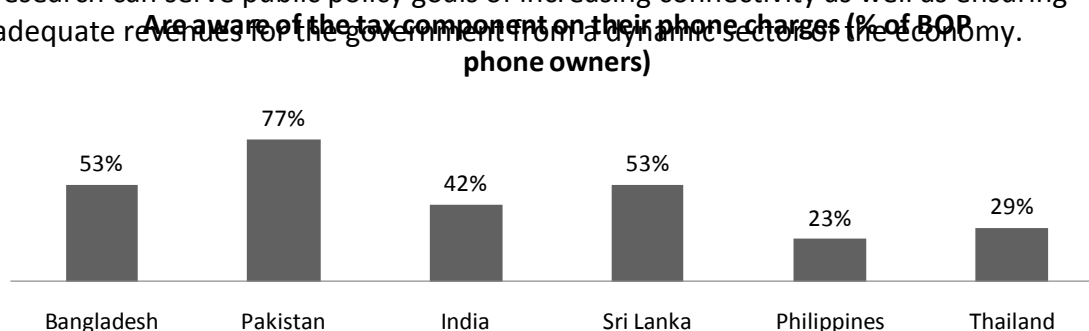


Figure 17: Awareness of tax component on phone charges (% of SEC D and E phone owners)

Source: LIRNEasia (2009) Teleuse@BOP3. Survey findings

6.0 Conclusion

Full participation in the global Internet Economy requires electronic connectivity of considerable complexity. Today, due to a worldwide wave of liberalization and technological and business innovations in the mobile space, much of the world is electronically connected, albeit not at the levels that would fully support participation in the global Internet Economy. Yet, many millions of poor people are engaging in tasks normally associated with the Internet such as information retrieval, payments and remote computing using relatively simple mobiles. Understanding the business model that enabled impressive gains in voice connectivity as well as the beginnings of more-than-voice applications over mobiles is important not only because widespread broadband access among the poor is likely to be achieved by extending this model but because it would be the basis of coherent and efficacious policy and regulatory responses.

This report demonstrates that voice connectivity was achieved for a majority of the world's people, including substantial numbers of the poor, because governments removed or lowered barriers to participation in the supply of telecom services and created conditions somewhat conducive to competition, even if less than perfect. This was the necessary condition.

Where multiple suppliers existed, intense competition, the critical step of implementing the budget telecom network model, occurred. The resulting radically lower prices attracted more minutes of use, which in turn made further reductions possible. Operators were able to load their networks with high volumes of revenue-yielding minutes because they had succeeded in reducing the transaction costs of dealing with low-volume customers. Prepaid, which accommodates the needs of those with irregular earning patterns was also a critical element. Along with these business process innovations, the exponents of the budget telecom network model also succeeded in drastically reducing costs, especially opex. The new model makes ARPU irrelevant because what really matters is how many revenue-yielding minutes are carried on the network, not how much money is earned from a customer. In the same way that Ryan Air and Air Asia make profits while conventional airlines lose money, budget telecom networks make more money than conventional operators. However, the model increases the volatility of earnings and results in lower quality of service.

The extension of the budget telecom network model to broadband requires that small, prepaid, irregular payments be allowed, which is a significant deviation from the dominant always-on, all-you-can-eat models. It appears that the former is already emerging in the mobile-based broadband offerings such as HSPA.

This suggests that accessing the Internet over mobile networks, whether from fixed locations, nomadically or while actually mobile, will become a major, if not the dominant, mode. This fits into the present trends where many functions of the Internet, such as communication in multifarious forms, information retrieval and remote computing, are increasingly occurring over mobile networks through

relatively modest and inexpensive mobile handsets. There is evidence that more than voice applications that foreshadow participation in the Internet Economy are beginning to gain ground among the poor, especially among the youth cohorts. It may be expected that these uses will increase as the business model gets sharpened and more services offered.

If business process innovations enabled by competition are solving the problem of electronically connecting billions of poor people, what is the role of government? When a business model is delivering the goods, rather than direct government action, the most appropriate government action would be that which supports the business model. Policy and regulatory actions must be derived more from analysis of the requirements of the business model and less from public administration theory. Early in the present reform cycle the need to adopt policy and regulatory solutions that fitted the specific institutional circumstances was identified. Yet, in actual practice, policy and regulatory solutions devised for developed-country circumstances tended to be applied in very different settings.

The emergence of a new business model and deeper understanding of the functioning of government institutions in developing countries offers a possibility of devising policy and regulatory solutions with a better fit. This would, for example, involve a greater emphasis on lowering market-entry barriers and making available more spectrum ahead of the previous preoccupation with interconnection. As costs come down across the board, the relative importance of the key input of domestic and international backhaul capacity increases, requiring greater regulatory attention. Again as retail prices come down, the importance of regulating anti-competitive practices will increase, especially with regard to vertical price squeeze.

The business model results in heavy loading of networks, necessarily resulting in occasional problems with quality of service. Gentle supervision of QOS which places emphasis on publishing comparative performance data and lowering barrier to the switching of suppliers would be the appropriate response in terms of the business model. Universal service funds have proved a failure and are inimical to the business model. They should therefore be phased out. Taxation is increasingly becoming a central element of government action with regard to telecommunications. It requires further study to identify the best ways in which governments can collect reasonable revenues without disrupting the business model.

Coherence of different policy and regulatory actions is a good thing. It can be achieved by fully understanding the core budget telecom network business model and ensuring that all policy and regulatory actions are consistent with it, not solely in terms of making the model work, but also in terms of ensuring that public-policy objectives are achieved by leveraging the model rather than working at cross purposes to it.

LIRNEasia@5 Conference

Workshop Report

December 9-11, 2009

Colombo, Sri Lanka

IDRC Project Number: 104918-001

IDRC Project Title: Advancing evidence-based policymaking and regulation in the emerging Asia-Pacific to ensure greater participation in ICTs (Phase II)

Country/Region: Sri Lanka

Research Institution: LIRNEasia

Address of Research Institution: 12 Balcombe Place, Colombo 8, Sri Lanka

***This report is presented as received from project recipient(s). It has not been subjected to peer review or other review processes.**

REPORT

LA@5 Conference

9 – 11 December, Taj Hotel, Colombo, Sri Lanka

LIRNEasia@5 or the 'LA@5' international conference was held from 9 – 11 December at the Taj Hotel, Colombo to celebrate the fifth-year anniversary of LIRNEasia.

Over 180 participants from twenty five countries attended the LA@5 Conference of which about 100 were from abroad. Participants included young scholars, researchers and senior scholars who attended the CPRsouth4 conference held prior to the LA@5 Conference in Negombo, Sri Lanka as well as representatives from regulatory authorities, private telecom operators, university professors and media.

The invited guests for the Opening ceremony included H.E. Bruce Levy, High Commissioner for Canada and Stephen McGurk, Regional Director for South Asia and China for IDRC.

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1. Evidence-based policymaking in Asia: the Indian path or the Chinese path?

The opening session was chaired and moderated by Milinda Moragoda, M.P. , Minister of Justice and Law Reforms, Sri Lanka. The participants included Pratap Bhanu Mehta from Center for Policy Research (India) and Xue Lan, Professor and Dean of the School of Public Policy and Management at Tsinghua University (China) who participated via web conference.

Ad hoc public policy formulation and how it can be disastrous was discussed and how both China and India are evolving evidence based processes to back effective government action. Lan stated that the strategic direction is set by the Party and State Council and the People's Congress makes legislation in China.

The Chair brought up the subject of how to manage long term and short term reforms as a politician.

- Xue Lan responded that the two key elements are the election of leaders and the elaboration of policy however he further went on to state that organizations can play a very constructive role in the deliberation of public policy.
- Mehta stated that political systems have to be embedded in political and social realities from which they emerge and that the two things South Asia has done wrong is the way its state structures are defined and the lack of clarity about what function should be performed at what level.

When discussing the challenges facing these two countries; Xue Lan explained that biggest challenge China faces is regional disparities and the environment. The resource constraints and pollution posing further problems in the future. The biggest challenge for India according to Mehta is the high levels of poverty that still exist in India despite the emergence of a generation that sees the possibility of moving out of poverty.

2. Research to policy

The beginning session of the second day was chaired by Robin Mansell from LSE (UK) and the participants consisted of Phet Sayo from IDRC (India), Rajat Kathuria from ICRIER (India), Emmanuel Lallana from IdeaCorp (Philippines), Per Helmersen from Telenor Research and Innovation (Norway) and Rohan Samarajiva from LIRNEasia.

The objective of the session was to consider the entirety of LIRNEasia as a research project and to discover ways of bringing research to policy, drawing out the lessons. LIRNEasia has sought to effect policy change by aggressively communicating the findings of its research to three primary audiences of policymakers, regulators and senior managers of operators and two secondary audiences of media and opinion leaders who may influence one or more of the primary audiences.

Finding from two external evaluations in two forms; from IDRC and by an external researcher, Kathuria who looked at what LIRNEasia did in Indonesia were presented. Rajat Jathuria will talk about the Indonesian example. The trigger for the study was a study published by LIRNEasia in 2005 that found that leased line prices in Indonesia were multiples of those in Asia.

This was followed by two active discussion on whether LIRNEasia is replicable and how evidence get used within governments and corporations. Helmerson stated that he believes that decisions are often based on gut feelings and that a lot of research is not contextual and that one need to understand the mindset and priorities of decision makers and focus on attention-getters by telling them something they don't know.

3. Knowledge to Innovation Session

This session was chaired by Stephen McGurk from IDRC (India) and included Sujata Gamage from LIRNEasia, Glenda Kruss from Human Science Research Council (South Africa), Rasheed Sulaiman, from Centre for Research on Innovation and Science Policy (India) and Veena Ravichandran from IDRC (Canada)

The objective of the session was to identify the changes to the role of universities and research institutes as knowledge producers and the emergence of new roles of government extension services and the emerging importance of informal knowledge especially with advances in information and communication technologies, modes of knowledge acquisition, dissemination and use having changed dramatically in the recent times.

Kruss showed in her presentation on Nigerian and Ugandan Firms that there were very low levels of R&D investment and that universities were the least important sources of knowledge and tend to view them negatively. She explained further that improvements to their processes were incremental and involved low levels of innovation and that their main sources of knowledge were firm's own manufacturing operations, customers and competitors. Their channels of interaction are informal, indirect and widely available publicly.

Sulaiman in his presentation on "Challenges in reforming agricultural extension" noted the changing role of extensions service from the disseminating of knowledge to promoting innovation by paying the role of facilitator in the full range of interactions involving the four domains,- Enterprise, Demand, Research and Support- with the support domain including Financial institutions, Transport and marketing Infrastructure, Professional networks and the Education System.

Gamage in her presentation on the role of informal knowledge in innovation demonstrated the increasing importance of peer-to-peer interactions in solid waste managers as they innovate to improve the solid waste services in local government in Sri Lanka.

4. Measuring sector Performance

The session was chaired by Tim Kelly from *infoDev*, World Bank (USA) and consisted of Helani Galpaya from LIRNEasia, Hernan Galperin from DIRSI (Argentina) and Alison Gillwald from RIA (South Africa).

Kelly set the tone of the forthcoming discussion by stating that the best way to get the attention of policy makers is by using national rankings but when making international comparisons, one need to have the appropriate sized goldfish bowl. He further went on to state that proper caution must be taken before making unsubstantiated claims as what we say has big consequences on the real world. Results that might have been true for one period may not be true for a longer period.

Galpaya talked about the TRE survey, which is a tool developed by LIRNEasia to assess stakeholder perception of the telecom regulatory environment in several countries, it evaluates along 7 dimensions namely Market Entry, Allocation of Scarce Resources, Interconnection, Regulation of Anti-Competitive Practices, Universal Service Obligations, Tariff Regulation central to most regulators' activities and Quality of Service. The study undertaken has made multiple, evidence based policy interventions related to USO and access policies in India.

5. New Approaches to Regulation

The theme of this session was in examining new approaches to telecom regulation. There are many regulatory challenges in sectors long-dominated by monopoly incumbents and such challenges are compounded by the fast changing technologies that require regulators to keep several steps ahead of the curve in order make sure competitive markets develop while providing incentives for innovation and investment. In addition, many emerging economies are faced with the additional burden of having regulatory agencies that lack of capacity and resources.

The session was chaired by Sherille Ismail, J.D. of the Federal Communications' Commission (USA). The panellists consisted of Tahani Iqbal (LIRNEasia & the Lee Kuan Yew School of Public Policy, National University of Singapore), Johannes Bauer from Michigan State University (USA), Timothy Gonsalves from IIT-Madras (India) and Rohan Samarajiva from LIRNEasia.

Ismail began by quoting Adam Smith's self-coined metaphor of the "invisible hand", a term economists use to describe the self-regulating nature of the marketplace. There are three main transitions that take place when markets change or develop: feudal to industrial, communist to post-communist and emerging to developed. As such, capacity and skills must be built and sustained on an ongoing basis for a successful market to emerge.

A "banded forbearance" approach to tariff regulation was explored in this session. This approach involves identifying a peer group, defining a benchmark for prices, and defining a lower and upper band

limit, within which tariffs should be contained. Some of the main advantages of such a system are that it would apply to all operators, is administratively less intensive and constrains discretion.

Another topic discussed was the use of a “lowest cost frontier” as a tool of comparing tariffs within and between operators, nationally and internationally, such that better-informed consumer and regulatory decisions could be made. He further went on to discuss its advantage of overcoming challenges posed by differentiated pricing and also its limitations which is that periods of free use and bundling of services are difficult to accommodate.

Timothy Gonsalves’ presentation was on customer-driven regulation of broadband prices. He stated that telecom regulation is highly technical and largely driven by operators, vendors and independent experts; the public’s view is usually only cursory and that, there is often a mismatch between regulatory requirements and expectations of subscribers.

Rohan Samarajiva argued for a shift in regulatory thinking from the “abstract” to one that is based on a country’s prevalent institutional environment and dominant business model(s). Theoretically, interconnection is often considered to be one of the most important priorities in regulation. However, historically, in practice, the critical success factor has been interconnection, and not spectrum and licences and therefore one need to prioritize and derive regulatory practices from business models rather than the abstract.

6. Mobile 2.0 for Commerce and Entertainment @ Bottom of the Pyramid

The objective was to present the research on Mobile 2.0 and explore the possibility of mutually beneficial research partnerships. The use of non-voice services can be termed Mobile 2.0 – the next wave of the mobile use. The mobile may be seen more and more as a device that connects the unconnected to the world in various ways previously unperceived, including to the potential of the Internet.

The following session was Chaired by Helani Galpaya from LIRNEasia and included Harsha de Silva and Ayesha Zainudeen both from LIRNEasia, Puree Sirasoontorn from Thammasat University (Thailand), K F Lai from BuzzCity (Singapore) and Chirag Jain from GupShup (India)

M-payment is perhaps the most remarkable Mobile 2.0 phenomenon and the most discussed in the session. With low credit-card penetration levels, use of mobile-based payments is emerging as a substitute in many developing countries such as Kenya and the Philippines. Mobiles have played a distinct role in the informal payment systems like Hawala and Hundi for some time. The transition to formal systems might position mobile handsets in even more prominent positions in the lives of the migrants and the family members left behind.

Mobile broadband is also rapidly making its mark in emerging Asia, perhaps as a result of weaknesses of conventional broadband supply by fixed operators, still not fully reformed from their monopoly ways.

Covering regions in ways fixed broadband never could and offering relatively lower and more convenient price options, it has already raced ahead of fixed broadband in countries like Sri Lanka and Indonesia. With broadband access gradually becoming a standard in mobile handsets, it could be the net entry point to so far unconnected billions in Asia.

The participants and audience mostly discussed the m-business opportunities in general in this session.

7. Proof of the pudding 1 (policymakers and regulators)

The concluding session of the second day was a panel discussion to give first of all the opportunity for current and former government and regulatory officials to reflect on their interactions with LIRNEasia over the past five years in general and on the preceding presentations in particular and also to include opinions of senior policymakers and regulators from the region on the value of evidence-based policymaking.

The session was chaired by Professor Bill Melody, the formative thinker behind LIRNE.NET and LIRNEasia, who will ensure a lively and interactive exchange among the panelists as well as between the panel and the audience. The panelists included members from regulatory authorities of Pakistan, Thailand, India, Nepal, Maldives, Bhutan, Indonesia and also from the Competition Commission, Pakistan and Chulalongkorn University of Thailand.

A few important points were discussed such as whether policy research is useful to as you generally find that policy makers and regulators go through their own decision making process and tracing the affect of research is not easy and also whether policy research were useful in the panelists work? and if policy research could be more useful in the future.

8. Inclusive knowledge-based economies

The panel was chaired by Partha Mukhopadhyay from the Center for Policy Research (India) and consisted of Rohan Samarajiva from LIRNEasia, Robin Mansell from the London School of Economics and Political Science (LSE), Deunden Nikomborirak from the Thailand Development Research Institute, B.P. Sanjay from the Central University of Tamil Nadu (India) and Deepal Sooriyaarachchi from the Education Subcommittee of the Ceylon Chamber of Commerce (Sri Lanka).

The theme of the session was the old paradigm of top-down technology driven model of innovation leaves out bottom-up innovation that is more common in the developing world. Empirically driven research based on local and regional systems of innovation are more useful in describing Knowledge Based Economies (KBEs). The foundation of a knowledge based economy therefore is an inclusive society where knowledge exchange is not only about economics but also involves social, cultural and political dimensions. Knowledge resides in local contexts and in-situ human capacities are essential to

take advantage of opportunities that arise from localized knowledge. Deunden talked about Thailand and how MNCs do not conduct R&D in Thailand which leads to a lack of KBE in most sectors. Research in Thailand and elsewhere has shown that knowledge exchange in the SME sector often happens through value chains that connect buyers and suppliers. Such process based innovation contradicts the traditional top-down linkages between government, universities and private sector in knowledge creation and sharing.

Another point discussed was the use of digital technologies in developing worlds that still has some distance to go before they are utilized to codify and transmit knowledge generated from local process based innovation. The Teleuse@BOP research has shown that the BOP perceives telecom access to provide increased earning and/or savings. Given the past focus on ICT infrastructure and access (which has to a large extent been solved in the region), the next research thrust for LIRNEasia is to study the pre-conditions for inclusive knowledge based economies in the developing world where ICTs is a necessary but not sufficient condition.

It was pointed out that looking at the data, not to put too high hopes on ICT for innovation but to start with basic communication that require that broadband is readily available and affordable. Further discussed was the finding of information (suppliers, workers, raw materials) though very useful is not provided by the government and therefore the reality which is that perhaps the private sector should stop lobbying the government and do this themselves.

9. ICT in Agriculture: agInfo --> agStrategy

The objective of the session was to build an evidenced based argument for the need to go beyond passive ICT interventions of information provision (*agInfo*) to innovations where ICT empowers agricultural households to make livelihood decisions based on a conducive, incentive framework (*agStrategy*). The session brought together perspectives from researchers as well as private sector service providers. The panel consisted of Sriganesh Lokanathan and Harsha de Silva from LIRNEasia, Fiona Smith from GSMA, Ranjit Pawar from Reuters Market Light(RML), Anjani Sinha from National Spot Exchange Limited(NSEL) and was chaired by Evan Due from International Development Research Centre(IDRC).

LIRNEasia researchers articulated the ability of ICTs to provide demand-driven and accurate information that can reduce information search costs for farmers and thereby reduce transactions costs. RML in India provides farmers with *localized* information on weather, crop advice and market prices that have enabled farmers in India to improve their livelihoods from farming. Similarly the NSEL in India has allowed farmers to trade on the electronic spot exchange utilizing low volume lots. Both NSEL and RML have aimed to reduce the cost of intermediaries and improve farmer's market orientation and thus their livelihoods. As NSEL's customized solutions in different locations have shown, ICTs can facilitate the confluence of multiple stakeholders who can provide a whole range of services needed by farmers. For

example the NSEL exchange in Kadi allows farmers to avail of commodity backed financing against their castor seed crop buffering them from low prices when there is a glut right after harvest.

Building on the lessons of having engaged in the provision of agricultural market price information in Sri Lanka since 2003, LIRNEasia researchers stressed the need for market based forward prices (rather than spot prices) as the means to reduce price volatility in agricultural markets in the developing world. To that extent LIRNEasia's current research is exploring various mechanisms of introducing ICT based forwards prices which can provide farmers with some predictability and stability in their livelihoods.

The panel concluded that in order to fight agricultural poverty more such innovations were needed, backed by research to ensure that potential benefits were being realized.

10. Beyond Typical Early Warning

The Objective was for the International Disaster Management experts to revisit the lessons of LIRNEasia's research on community based integrated public warning systems to explore the possibility of joint research partnerships.

The session was chaired by Chanuka Wategama from LIRNEasia and two other LIRNEasia researchers Nuwan Waidyanatha, Rohan Samarajiva, Divakar Goswami an ex- LIRNEasia researcher, Atiq Ahmed from Asian Disaster Preparedness Centre (Thailand) and Stuart Weinstein from Pacific Tsunami Warning Center (USA)

It was discussed that integrated public warning involves a socio-technical arrangement that includes governance structures, training and education, as well as technological systems and devices. These elements must work together if public warning is to be effective. Abstractly speaking, integrated public warning systems require linking the sensor, detections, decision, message broker, and response systems in a chain. Each of the subsystems contains two main elements: organizational (social) structures and technologies but may differ between two systems of the chain; for example, the detection system may comprise intergovernmental organizations, which may be different from the more local organizational links within a response system.

A crucial but often overlooked part of early warning is not in the detection of an event per se, but rather in reaching the public with information about a risk; this is the "last-mile" stage of an early warning system. The last-mile refers to by which warnings and other risk information reaches the public.

LIRNEasia researchers present their work on early warning systems. LIRNEasia's research: Dam Safety, NEWS:SL, HazInfo, Cell Broadcast, m-Health, etc, that fit within the risk-reduction space, has been on Last-Mile Hazard Warning Systems. One aim in the LM-HWS initiative is to study and pilot alternative means that LM-HWS can adopt as detection and decision systems in situations the government has failed to provide them. For example, the HazInfo project used the web and other global email/rss feeds to monitor tsunamigenic earthquake activities, an alternative detection system, which the government

of Sri Lanka has failed to establish and provide in the form of a warning. It was explained that the intent of LIRNEasia was not to take over the role of the government but to provide evidentially sound systems that complement the government's initiatives or established systems.

11. Strategies by the BOP; Strategies for the BOP

Understanding people at the bottom of the pyramid and targeting them in a business and telecom sense is important. Communication and information produce positive benefits to poor people.

The session consisted of two parts. The first part of the session, *Strategies by the BOP: Understanding the BOP*, was chaired by Randy Spence from ESDA, and consisted of Ayesha Zainudeen from LIRNEasia, Christoph Stork from RIA, Aditya Dev Sood from CKS Consulting India, and Tim Kelly from, infoDev (World Bank).

The first part of the session focused on the magnitude and significance of the BOP in emerging markets. Developing countries account for almost three quarters of mobile connections, according to World Bank data. Though the BOP have low spending power, demand for services (current as well as future) exists in small amounts according to LIRNEasia's Teleuse@BOP3 survey data; aggregating this demand results in a large market, offering industry much opportunity. This is especially important in the face of declining prices and ARPUs. Large sample surveys can provide commercially valuable data, such as the willingness and ability to pay for service, potential market size etc, and allow for simulations of the impact of regulatory changes. This has been done for tax increases in Namibia by RIA. In addition to quantitative research, qualitative research is also valuable (in fact complementary) in providing insights on the nuances of ICT use and adoption decisions, based on CKS's work in various countries. The importance of ICTs for improving human capabilities by leveraging personal networks (using ICTs) was also discussed by the Chair, Randy Spence of IDRC. The issue of universal service funds was raised, and their real purpose and existence was questioned in light of near universal coverage in many developing countries, where multilateral donors still encourage their deployment.

The second part of the session, *Strategies for the BOP: What this means for business*, was chaired by Harsha de Silva from LIRNEasia, and consisted of Kentaro Toyama from Microsoft Research (India), Sultanur Reza from Grameenphone (Bangladesh, a subsidiary of Telenor) and Helani Galpaya from LIRNEasia.

The second part of the session dealt with the industry perspective. Innovations in technology, business models and policy are required to serve the BOP efficiently. Telenor as well as Microsoft Research are two companies which are making a conscious effort to engage with BOP research, through dedicated research units. From the perspective of designing strategy and products, it is important for companies to engage with such research in order to gain a deeper understanding of the market segment and how it really works. Often, preconceived notions of what is "normal" versus what is not are imposed on for the

BOP, leading to poorly designed strategy and products; well designed and informed research can help to avoid this.

Grameenphone has a history of serving the BOP through CSR activities (e.g., Village Phone) as well as business ventures (e.g., CellBazaar). It leverages its strong brand value as well as key partners at the grassroots level in order to increase its service uptake among the BOP.

In light of the expansion of the market to low-income, low-expenditure BOP consumers as well as competitive pressure, operators are adjusting their business models to find new ways to make money. Prepaid connections, electronic reloading, network sharing, etc are all innovations through which some Asian mobile operators managed to maintain 50-60 percent EBITDA levels, whilst expanding their markets to the BOP two to three years ago. This *Budget telecom network* model (similar to the budget airline model) is also being replicated in the broadband market. However, these companies are making less and less money, and many operators in the region are making losses. Whether this is a temporary effect of the global economic crisis is unclear at this point. But if it is the case, consolidation and the re-emergence of fresh economies of scale will probably be an eventual result of where the market is heading.

12. Proof of the Pudding 2 (service providers, operators and manufacturers)

The concluding session of the conference was a panel discussion chaired by Divakar Goswami, from Deloitte Research (India). The panel consisted of Kristin Due Hauge from GSMA (UK), Hans Wijayasuriya from Axiata (Malaysia), Dumindra Ratnayake from Tigo (Sri Lanka), Sanna Eskelinen from Nokia (Finland) and K.F. Lai from BuzzCity (Singapore)

The questions discussed included the usefulness of LIRNEasia's research to the panelists and also what are the mobile services and solutions would they like to see in the future?

Wijayasuriya talked about how regulators are responding to phenomenon of a price war in the region where you reach a point where the market is inelastic and a price war gets very destructive and whether it is in the best interest of the consumer. How this can constrain the cash flows available for futuristic investment.

There were also discussions into how telecom regulator needs to be educated to the point of a financial regulator and then put him or her at the top.

Latin American examples were explained where the mobile operators were compared to like the fixed operators of the 80s, who asks regulators to save them without talking about productive ways like taxes and spectrum to save themselves.

Annexure 1

Agenda: LA@5

9 December 2009

Time	Topic	Speakers
1800-1830	Opening Ceremony and Welcome	H.E. Bruce Levy Stephen McGurk Rohan Samarajiva
1830-2000	Evidence-based policymaking in Asia: the Indian path or the Chinese path?	Chair & Moderator - Milinda Moragoda Pratap Bhanu Mehta Xue Lan, Tsinghua University, China
2000-	Dinner	

10 December 2009

Time	Topic	Speakers
0900 – 1010	Research → Policy	Chair – Robin Mansell Phet Sayo Rajat Kathuria Emmanuel Lallana Per Helmersen Rohan Samarajiva
1010 – 1030	Networking Break	
1030 – 1130	Knowledge to Innovation	Chair – Stephen McGurk Sujata Gamage Glenda Kruss Rasheed Sulaiman Veena Ravichandran
1130 – 1220	Measuring Sector Performance	Chair – Tim Kelly Helani Galpaya Hernan Galperin Alison Gillwald

1220 – 1345	Lunch + Presentation on Sri Lanka's wildlife by Gehan de Silva Wijeyeratne	
1345 – 1445	New Approaches to Regulation	Chair - Sherille Ismail Tahani Iqbal Johannes Bauer Timothy Gonsalves Rohan Samarajiva
1445 – 1500	Networking Break	
1500 – 1630	Mobile 2.0 for Commerce and Entertainment	Chair – Helani Galpaya Harsha de Silva Ayesha Zainudeen Puree Sirasoonorn K F Lai Chirag Jain
1630 – 1800	Proof of the pudding 1 (regulators and policy makers)	Chair – William Melody Muhammed Yaseen Sudharma Yoonaidharma Joseph Wilson R.K. Arnold Ananda Raj Khanal Ilyas Ahmed Koesmarihati Sugondo Wangay Dorji Pirongrong Ramasoota Rananand
1800 – 1900	Free Time	
1900 -	Dinner & Party @ The Galle Face Hotel (across the street from the Taj)	

11 December 2009

Time	Topic	Speakers
0900 – 0950	Inclusive knowledge-based economies	Chair- Partha Mukhopadhyay Rohan Samarajiva Robin Mansell Deunden Nikomborirak B.P. Sanjay

		Deepal Sooriyaarachchi
0950 – 1015	Networking Break	
1015 – 1125	AgInfo -> AgStrategy	Chair – Evan Due Sriganesh Lokanathan Harsha de Silva Ranjit Pawar Anjani Sinha Fiona Smith
1125 – 1240	Beyond Typical Early Warning	Chair – Chanuka Wattegama, LIRNEasia Nuwan Waidyanatha Rohan Samarajiva Divakar Goswami Atiq Ahmed Stuart Weinstein
1240 – 1400	Lunch	
1400 – 1510	Strategies by the BOP: Understanding the BOP	Chair – Randy Spence Ayesha Zainudeen Christoph Stork Aditya Dev Sood Tim Kelly
1510 – 1530	Networking Break	
1530 – 1620	Strategies for the BOP: What this means for business	Chair - Harsha de Silva Kentaro Toyama Sultanur Reza Helani Galpaya
1620 – 1730	Proof of the Pudding 2 (service providers, operators and manufacturers)	Chair – Divakar Goswami Kristin Due Hauge Hans Wijayasuriya Dumindra Ratnayake Sanna Eskelinen K.F. Lai
1730 -	Close of conference, followed by free time and dinner in groups	

Annexure 2:

List of participants

Name of participant	Country
A H M Sultanur Reza	Bangladesh
Abu Saeed Khan	Malaysia
Aditya Dev Sood	India
Aileen Agüero	Sri Lanka
Alison Gillwald	South Africa
Amali Nanayakkara	Sri Lanka
Ananda Raj Khanal	Nepal
Anders Henten	Denmark
Anjani Sinha	India
Antony Thambayah	Sri Lanka
Arif Sargana	Pakistan
Arjuna Weerasinghe	Sri Lanka
Aruni Perera	Sri Lanka
Asanga Priyadarshana	Sri Lanka
Asanka Sanath	Sri Lanka
Asantha Sirimanna	Sri Lanka
Ashok Jhunhunwalla	India
Aslam Hayat	Bangladesh
Atiq Kainan Ahmed	Thailand
B P Sanjay	India
Begum Nazneen Begum	Bangladesh
Begum Dilruba Begum	Bangladesh
Bhanu Garg	India
Bonifasius Wahyu Pudjianto	South Korea
Bruce Levy	Sri Lanka
Buwan Singh	Sri Lanka
Calduwel Newton	India
Catherine Candano	Philippines
Chammi Gunathilike	Sri Lanka
Chanuka Wattergama	Sri Lanka
Charitha Ratwatte	Sri Lanka
Charitha Ratwatte (Junior)	Sri Lanka
Chelladurai Jebakumar	India
Chirag Jain	India
Christoph Stork	South Africa
Chulanga Dassanayake	Sri Lanka
Chunhui Yuan	China
Cornel Perera	Sri Lanka
Deepak Bhandari	India
Deepal Sooriarachchi	Sri Lanka
Deunden Nikomborirak	Thailand

Dharsha Dulanjali	Sri Lanka
Dimuthu Ratnadiwakara	Sri Lanka
Dinesh Saparamadu	Sri Lanka
Divakar Goswami	India
Dumindra Ratnayake	Sri Lanka
Duruthu Edirimuni	Sri Lanka
Emmanuel C. Lallana	Philippines
Evan Due	Singapore
Faheem Hussain	Bangladesh
Fiona Smith Smith	UK
Gaki Tshering	Bhutan
Gehan Wijerathne	Sri Lanka
Gita Sabharwal,	Sri Lanka
Glenda Kruss	South Africa
Gong Zhenwei	China
Gopal Sarangi	India
Hamidul Mishbah	Bangladesh
Hans Wijayasuriya	Sri Lanka
Harsha de Silva	Sri Lanka
Haymar Win Tun	Myanmar
Helani Galpaya	Sri Lanka
Hernan Galperin	Argentina
Ibrahim Kholilul Rohman	Indonesia
Il hamme Peterson	Sri Lanka
Illyas Ahmed	Maldives
Ingrid Knutson	Sri Lanka
Iran Fenando	Sri Lanka
Janaka Samaranayake	Sri Lanka
Jinendra Kothalawala	Sri Lanka
Jitender singh	India
Jivaka Weeratunge	Sri Lanka
Johannes M. Bauer	USA
Joseph Wilson	Pakistan
Jude Genilo	Bangladesh
Juniarti Soehardjo	Indonesia
K F Lai	Singapore
Kashif Janjua	Pakistan
Kavan Ratnayake	Sri Lanka
Kentaro Toyama	India
Khaled Fourati	South Africa
Koesmarihati Sugando	Indonesia
Kosala Wickramanayake	Sri Lanka
Kristin Due Hauge	UK
Lakshaman Bandaranayake	Sri Lanka
Lalith Gamage	Sri Lanka
Lasintha Ferdinando	Sri Lanka

Luxman Siriwardena	Sri Lanka
Mark Reginold	Sri Lanka
Mel Gunsekera	Sri Lanka
Milagros Rivera	Singapore
Milinda Moragoda	Sri Lanka
Mina Limbu	Nepal
Mohammed Ismail	Bangladesh
Mohammed Yaseen	Pakistan
Murtaza Jafferjee	Sri Lanka
N. Bandaranayake	Sri Lanka
N. Bandaranayake	Sri Lanka
Nalaka Gunawardena	Sri Lanka
Nazima Shaheen	Pakistan
Nihal Ratnayake	Sri Lanka
Nilusha Kapugama	Sri Lanka
Nirmali Sivapragasam	Sri Lanka
Nirosha Nissanka	Sri Lanka
Niroshini Nayagam	Sri Lanka
Nuwan Waidyanatha	Sri Lanka
Panuporn Patarachoke	Thailand
Partha Mukhopadhyaya	India
Passanan Rattana-Ngam	Thailand
Patrick Xavier	Australia
Per Helmersen	Norway
Peter Anderson	Canada
Phet Sayo	India
Pirongrong Ramasoota	Thailand
Pradeep Fernando	Australia
Prashanthi Weragoda	Sri Lanka
Pratap Bhanu Mehta	India
Pratichi Joshi	Sri Lanka
Pratompong Srinuan	Thailand
Priyadarshini Liyanage	Sri Lanka
Priyanthi Rajapakse	Sri Lanka
Puree Sirasanthorn	Thailand
Pushya Gunawardhana	Sri Lanka
R. K. Arnold	India
Rajat Kathuria	India
Randy Spence	Canada
Ranjit Pawar	India
Ranmalee Gamage	Sri Lanka
Rasheda Sultana	Bangladesh
Rasheed Sulaiman Vadakkal	India
Robin Mansell	UK
Rohan Samarajiva	Sri Lanka
Rong Wang	Singapore

Ruchini Weerawardena	Sri Lanka
Sabina Fernando	Australia
Sajeevani De Silva	Sri Lanka
Sanchala Arangalage	Sri Lanka
Sandya Salgado	Sri Lanka
Sangamitra Ramachander	UK
Sanjaya Senanayake	Sri Lanka
Sanjiva Weerawarana	Sri Lanka
Sanna Eskelinen	Finland
Sarah Ahmad	Pakistan
Sarasali Fonseka	Sri Lanka
Sean Harricus	Sri Lanka
Shahani Marcus	Sri Lanka
Shaheen Cader	Sri Lanka
Shaifali Veda	India
Shakila Wijewardhana	Sri Lanka
Shamil Zavahir	Sri Lanka
Shamistra Soysa	Sri Lanka
Shazna Zuhyle	Sri Lanka
Sherille Ismail	USA
Shilu Chen	China
Shivanshi Joshi	India
Shoban Rainford	Sri Lanka
Sriganesh Lokanathan	Sri Lanka
Stephen McGurk	India
Stuart Weinstein	USA
Subodh Tripathy	Nepal
Sudharma Yoonaidharma	Thailand
Sujata Gamage	Sri Lanka
Suresh Bartlett	Sri Lanka
Susan Kline	USA
Tenzin Norbhu	India
Thipnattha Kungwarngraipaisarn	Thailand
Thiruchendurum Somasundarum	Sri Lanka
Tim Kelly	USA
Timothy Gonsalves	India
Timothy Ong	Sri Lanka
V Ravisankar	Sri Lanka
Veena Ravichandran	Canada
Vinay Acharya	India
Vineet Handa	India
Visakha Nanayakkara	Sri Lanka
Visoot Phongsathorn	Thailand
Wan Faizal	Malaysia
Wangay Dorji	Bhutan

LA@5 Conference
Colombo, Sri Lanka. 9-11 December 2009

William John Terrance Perera	Sri Lanka
William Melody	Denmark
Y.J. Park	Netherlands
Zarook Mimraz	Sri Lanka
Ziyad Riffa	Sri Lanka







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