

This article was downloaded by:[Samarajiva, Rohan]
[Samarajiva, Rohan]

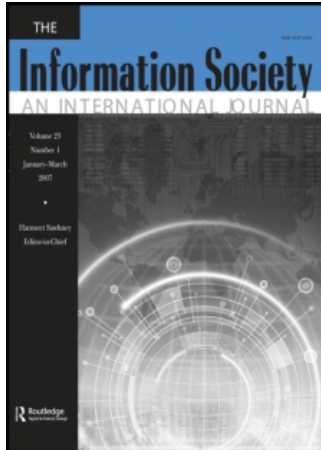
On: 27 March 2007

Access Details: [subscription number 772610577]

Publisher: Taylor & Francis

Informa Ltd Registered in England and Wales Registered Number: 1072954

Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



The Information Society An International Journal

Publication details, including instructions for authors and subscription information:
<http://www.informaworld.com/smpp/title-content=t713669588>

Bridging the Divide: Building Asia-Pacific Capacity for Effective Reforms

To cite this Article: , 'Bridging the Divide: Building Asia-Pacific Capacity for Effective Reforms', The Information Society, 23:2, 109 - 117

xxxx:journal To link to this article: DOI: 10.1080/01972240701224200

URL: <http://dx.doi.org/10.1080/01972240701224200>

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article maybe used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

© Taylor and Francis 2007

PERSPECTIVE

Bridging the Divide: Building Asia-Pacific Capacity for Effective Reforms

Rohan Samarajiva and Sujata Gamage

LIRNEasia, Colombo, Sri Lanka

This article spotlights the need to develop capacity for ICT policy and regulation within developing countries. It argues that capacity should be developed among all stakeholders, not solely within government agencies, because that would enable effective participation by many players in the regulatory process. The resulting participatory regulatory process will in turn increase accountability and procedural legitimacy. The article examines different approaches to developing in situ expertise, especially just-in-time learning and open-source research.

Keywords Asia-Pacific, capacity building, field building, information and communication technologies, just-in-time learning, open-source research, research networks, telecommunications reform

The Asia Pacific region leads in information and communication technologies (ICTs), both in manufacture and in use. However, stark contrasts exist between the developed and emerging parts, exemplified by Hong Kong SAR,

Received 18 September 2006; accepted 21 October 2006.

This article is based on the keynote presentation at the Digital Opportunity Forum 2006, Seoul, August 31, 2006. The helpful comments of the LIRNEasia colloquium participants, especially Sherille Ismail, Helani Galpaya, Divakar Goswami, and Kabir Hashim, (at: <http://www.lirneasia.net/2006/08/colloquium-on-bridging-the-divide-building-asia-pacific-capacity-for-effective-reforms/>, consulted 11 August 2006), are gratefully acknowledged. Some of these ideas were first presented in an address to the International Symposium organized by the Sabaragamuwa University of Sri Lanka, Belihuloya, 7 July 2006. This research was supported by the International Development Research Centre (IDRC) of Canada.

Address correspondence to Rohan Samarajiva, Executive Director, LIRNEasia, 12 Balcombe Place, Colombo 8, Sri Lanka. E-mail: samarajiva@lirne.net; web site: www.lirneasia.net

Singapore, and South Korea (a world leader in broadband) on the one hand and Papua New Guinea, Afghanistan, and Myanmar on the other (Figure 1). Of course, national averages mask the considerable disparities within countries. Figure 2 illustrates an internal divide, reduced considerably by reforms, but still significant.

After much debate, it is now recognized that economic growth is a necessary condition for the alleviation of human misery (or for the achievement of human development). The relation between the ability to communicate over distance using technological means and economic growth has been much discussed (Cronin et al., 1991, 1993b; Cronin et al., 1993a; Hardy, 1980; Mansell & Wehn, 1998; Menou, 1993; Samarajiva, 1995; World Bank, 1999). Correlation is beyond dispute, but the case for causation is unlikely to be fully established. Development requires many inputs, communication and knowledge being only some.

Establishing causation was considerably more important prior to the 1990s when public funds, domestic as well as donor, were still the main source of investments for expanding access to ICTs. There was a need to ensure that scarce financial resources were being spent on the services with the greatest public benefit. Now the burden of proof is much less because private capital is the main source of funding for expanding access. The always-beyond-expectations demand that has been exhibited by the unconnected when offered telecom services is reason enough for private investors (BBC, 2005; Nasarullah, 2004). The available evidence of employment and tax generation and similar benefits is adequate to justify government action to facilitate private supply (e.g., Lane et al., 2006).

The available evidence of demand and positive externalities from telecom services by the hitherto unserved and underserved provides adequate justification for policy intervention, though not necessarily for massive public investment. ICT infrastructure is undersupplied because

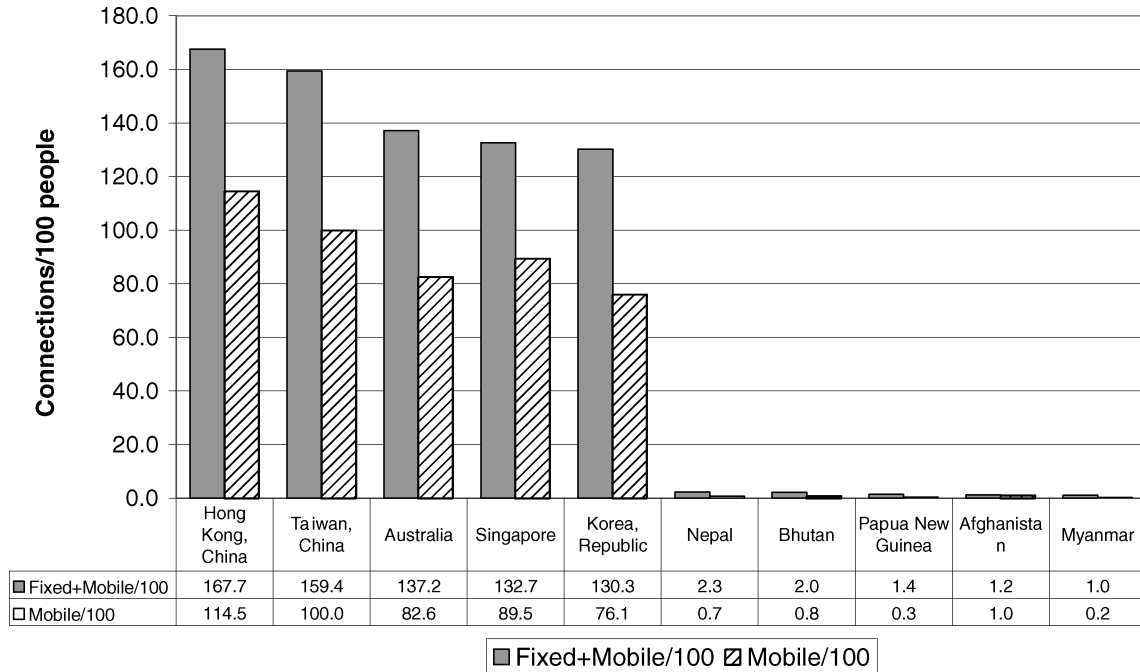


FIG. 1. The Asia Pacific region: the chasm within. Source: International Telecommunication Union (2005; 2004 data).

historically evolved policy locked in by inertia constrains supply. If technology by itself could increase supply, variations in connectivity across countries would not be as dramatic as at present, as shown in Figure 1.

Whenever policy constraints have been relaxed, supply has dramatically increased. The lifting of policy con-

straints may be described as liberalization, a process that began in 1984 with the AT&T Divestiture in the United States and the reforms in the United Kingdom that included the end of the BT monopoly and the establishment of OFTEL, now OFCOM, as a specialized sector regulator in the United Kingdom. Conceptually, liberalization

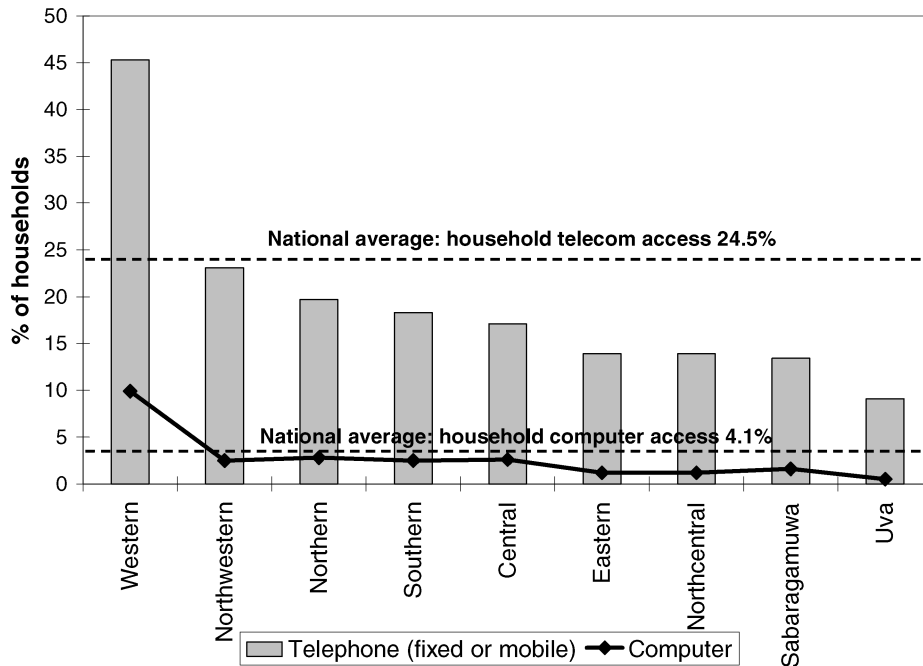


FIG. 2. Example of internal divide: telecom access and computers in Sri Lankan households, by province, 2004. Source: Central Bank of Sri Lanka (2005), Special statistical appendix, Tables 9 and 10.

includes the following components, ideally in sequence (Fink et al., 2002; Samarajiva, 2002):

- The creation of an explicit regulatory regime, separate from the incumbent or major operator.
- The relaxation of entry controls to allow more suppliers to participate in the market.
- The internal reform of the incumbent or major operator, which in many cases includes a complete or partial change in ownership and/or management.

As liberalization gained traction in the developing world in the 1980s and 1990s, the emphasis tended to be placed on “big bang” reforms such as privatizations or the licensing of second entrants to replace monopolies with duopolies. The expertise for these transactions tended to be brought in from the developed world, where the reforms had already taken place. The hard work of continuing reform and implementation, in the form of effective regulation and fine-tuning and improving policy, tended to be neglected, partly because this work could not be done with external expertise, but required home-grown skills and will.

It is noteworthy that the both clusters of reforms shown in Figure 3 were driven using external expertise made possible by two World Bank technical assistance credits.¹ After the first cluster in 1996–1997, the regulatory commission engaged in significant substantive regulatory activity such as issuing fixed–fixed and fixed–mobile interconnections, holding public hearings, and conducting a license-condition violation proceeding, but even this was driven

by an expatriate director general who mobilized external expertise, funded by World Bank technical assistance, and recruited professional staff to supplement the existing engineers (Samarajiva, 2000a, 2000b). After the departure of the external actor, the commission reverted to its somnolent state, even though some expenditure continued for the automated frequency monitoring and management system that was procured in 1999. Expenditures from the World Bank Credit decreased, while the number of employees increased (Figure 4) and the performance of the regulatory agency declined.

The effects of the “big bang” reforms and the ebbs and flows of regulatory activity are also reflected in the investments going into the sector, as shown in Figure 5. The reforms of 1996–1997 and the availability of monopoly rents from the international exclusivity allowed the incumbent to invest heavily in its network, but this tapered off from 2000. By 2001, investment from nonincumbent operators exceeded that of the incumbent, but the overall amount went down to 1993 levels because of the uncertainty around the interpretation and duration of the five-year international exclusivity. It was only after the government announced the complete liberalization of the international market in 2002 that investments started to climb again (Samarajiva, 2004).

As the limits of what can be achieved from big-bang reforms were reached in various countries by around the turn of the century, the importance of developing capacity for developing appropriate policies and to implement them effectively through regulation and otherwise has become evident (Melody, 2002).

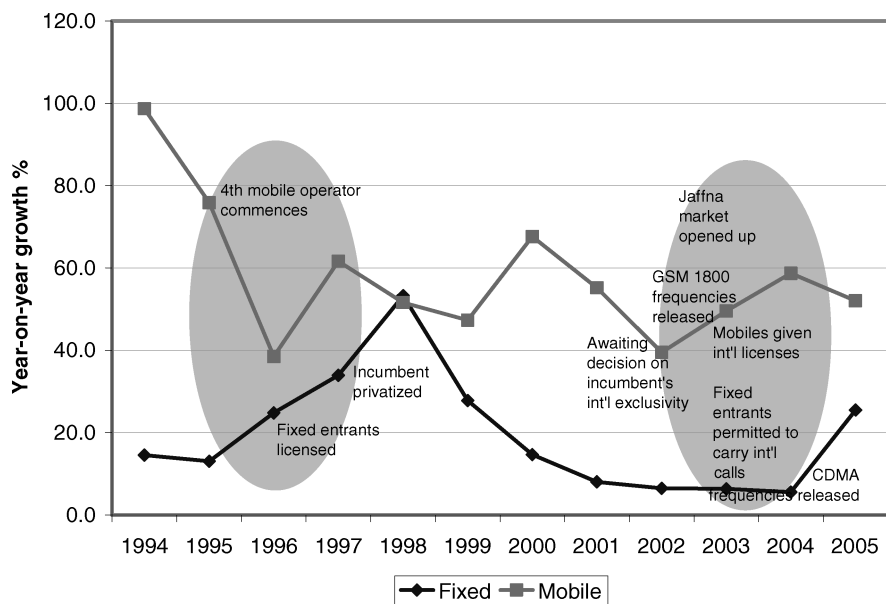


FIG. 3. Two sets of “big bang” reforms and fixed and mobile growth (year-on-year) in Sri Lanka. Source: Author; Telecom Regulatory Commission of Sri Lanka.

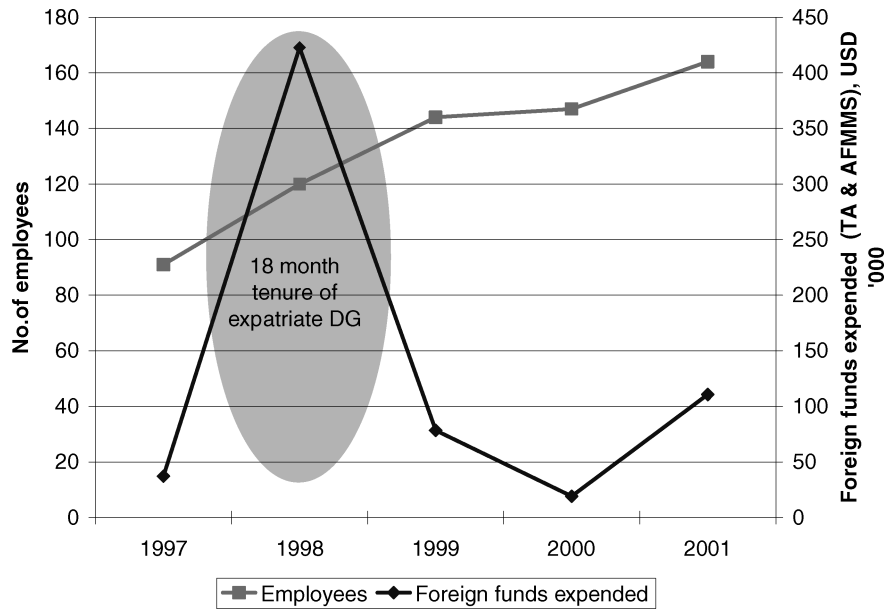


FIG. 4. Expenditures from a World Bank Credit and workforce expansion of a regulatory agency. Source: Author.

Capacity development can be conceptualized narrowly or broadly. In the narrow conception, all that is required is improving capacity in the government (ministry) or in the regulatory agency by training officials or hiring qualified persons. In the broad conception, capacity has to be built up among all stakeholders (operators as well as civil society), in addition to government and regulatory agency.

The broad conception is what is appropriate for the present liberalization model that rests on procedural legitimacy, which can only be derived from transparent and

participatory processes of regulation. Without capable officials in government and in regulatory agencies, regulation will be mediocre at best and counterproductive at worst. However, an optimal regulatory regime also requires adequate capacity among the suppliers and consumers, and requires their representatives to effectively participate in the regulatory process and give it forward momentum.

A sustainable solution within the broad conception requires the building up of in situ ICT policy and regulation expertise within countries. In situ expertise is necessary

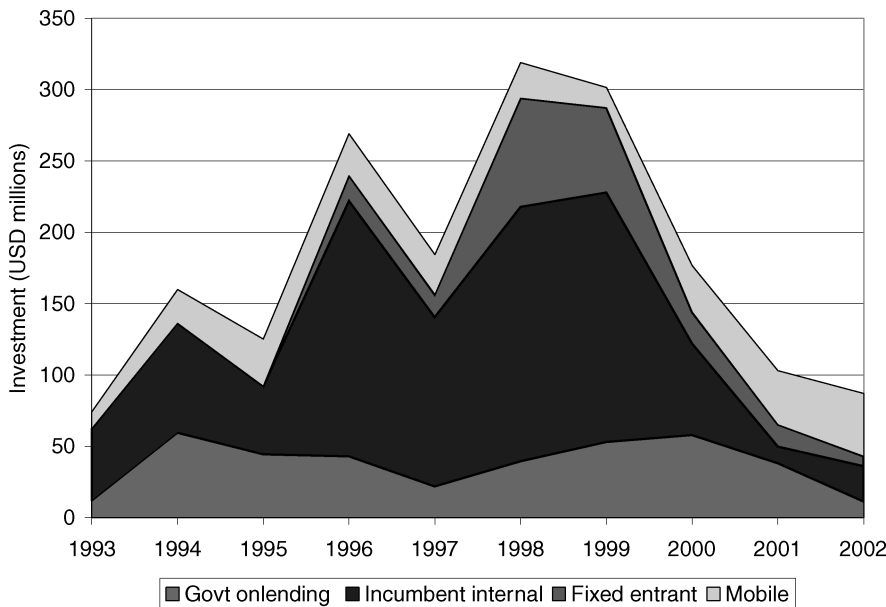


FIG. 5. Telecom investment in Sri Lanka, 1993–2002. Source: Samarajiva and Dokeniya (2005).

for several reasons. First, in situ expertise includes the tacit knowledge that is necessary to effectively maneuver through the policy battlefield of any country. Second, in situ expertise enjoys a legitimacy that external consultants do not. Finally, it allows for the quick mobilization of expertise within the windows of opportunity offered by a dynamic political and policy process, freed to a certain extent from the constraints of international consultancy procurement procedures, which can, even when expedited, take around 3 months.

In situ expertise is important, but it does not in anyway reduce the need for knowledge of similar policy or regulatory problems and solutions in different settings. Emphasizing in situ knowledge should not in anyway be conflated with the protectionist claims made in favor of indigenous expertise by some. The in situ expertise that is discussed in this article is strongly connected to external networks and is capable of synthesizing international and local knowledge. The nature of the policy and regulatory expertise that is required for contemporary needs is discussed in the next section.

IN SITU EXPERTISE

What is under discussion is policy-relevant knowledge for reducing the policy and regulatory constraints holding back ICTs and their use by the people of the Asia Pacific region. In some cases, such as the countries on the invisible side of Figure 1, there is still a need for “big bang” reforms such as the issuance of new licenses, the ending of monopolies, and changes in ownership and management of state-owned integrated incumbents. Others, many with better sector performance, have completed the “big bang” reforms but require continuing regulatory actions such as implementing interconnection. Of course, as Figure 3 showed, “big bang” reforms do not take place all at once; there can be clusters of such reform actions.

Even for “big bang” reforms, it is best that local expertise is available. The demand for expertise may be such that there is no alternative but to mobilize external consultants, but it is best that such consultants are managed by knowledgeable persons within the government or the regulatory agency. Participatory and consultative policy processes require expertise among the stakeholders as well. The synthesis of external and domestic expertise is what is optimal, especially if both sides are willing to listen and learn.

For the continuing processes of regulation and implementation of policy, domestic expertise is essential. A few countries such as Botswana have done well by stationing foreign experts in their regulatory agencies for long periods while aggressively training the local staff (International Telecommunication Union, 2002). Regulatory agencies in Bahrain, Hong Kong, and Singapore have recruited their senior managers internationally, also with good ef-

fect. However, not all countries are able to recruit internationally and pay expatriate salaries. Even where this flexibility exists, the optimal mix includes local experts.

With regard to continuing actions such as regulation, the consultative processes are even more important. For effective consultative processes, the stakeholders must be equipped to participate. That requires in situ expertise.

A single human being cannot be expert on all aspects of ICT policy and regulation. This is true for most areas of knowledge in this rapidly changing era, but it is especially true for ICT policy and regulation. Fortunately, research networks sustained by the Internet allow a single person to command a wide range of expertise. The following subsections describe two approaches to research that LIRNEasia has used to good effect.

Just-in-Time Learning

In the old order, learning was done during a 3- to 4-year contiguous period spent at a university. But now, things are very different. Experts are expected to have comprehensive knowledge about any matter that falls within the broad purview of their subject and are expected to respond quickly to demands from policy and regulatory actors. This can be illustrated with a real-life example: LIRNEasia's recent work on advising the government and stakeholders in Bangladesh on the new submarine cable.

Bangladesh was, for a long time, the largest country in the world without access to a submarine cable. In December 2005, the SEA-ME-WE 4 cable landed at the beach in Cox's Bazaar, quite a distance from the population centers of the country. The nonprivatized incumbent was tied up in the knots of its own incompetence and signed contracts for the dry portion of the cable only that month. The regulatory regime to allow cost-oriented and nondiscriminatory access to the cable by all competitors had not even been thought of.

LIRNEasia was invited to address a large gathering of stakeholders, including the minister, at this critical point, just before the cable landed. The subject was so esoteric that it was unlikely that we could have found an undersea cable policy specialist with ready-made knowledge on issues facing a country connecting to one for the first time. However, we were able to develop an informative and persuasive presentation at very short notice.

This was because (a) I had the knowledge of the underlying theoretical issues of competition, essential facilities, access regimes, etc.; (b) I was part of a network of contacts who quickly and comprehensively responded to my information requests; and (c) the Internet enabled the exchanges and the follow-up actions. Because of (a), the right questions were asked; because of (b), it was possible to confirm that the questions were the right ones and obtain additional leads on answers; and (c) made the actions possible.

The Internet was indispensable, but that is not the main point. The main point is that the knowledge had to be generated just in time. The presentation assembled information on the issues faced by West African countries in similar circumstances in 2002 and framed the debate for Bangladesh under the rubric “West Africa 2002 = Bangladesh 2005.”

The presentation and the subsequent op-ed piece were quite effective, not yet in devising an optimal access regime for the submarine cable but in changing the terms of the debate as to how it should be done (Samarajiva, 2005). This could not have been done without the just-in-time approach.

This is the model that will be most effective for in situ policy intellectuals. They should be able to assemble knowledge on ICT policy and regulation issues quickly, drawing from core theoretical knowledge and from their networks. They cannot be expert on every conceivable topic, but they can have a firm command of the basics and be equipped to learn more just-in-time.

Open-Source Research

“Given enough eyeballs, all bugs are shallow.” This is Linus [Torvald]’s Law, and one of the main strengths of open-source software. Because it has been looked over by so many users or codevelopers who have all contributed by spotting weaknesses or bugs, open-source software tends to be more robust than proprietary software.

In the kind of policy-relevant research that is necessary to remove the constraints affecting ICTs, speed is as important as accuracy. One solution, adopted by LIRNEasia, is open-source research. LIRNEasia does not claim omniscience. Therefore, its researchers work with multiple drafts that are published on the web. In some cases such as the work done on a national early warning system for Sri Lanka in the 3 months after the tsunami, expert forums, public meetings, and wide media publicity were used to tell people about the drafts. Based on the many comments received, the drafts were extensively revised.²

The open-source approach converts readers into reviewers and improves the quality of the final product. As a by-product, there is also greater buy-in. In one case where drafts of LIRNEasia research papers were shared with the Indian Telecom Regulatory Authority (TRAI), many of the ideas reappeared in TRAI’s recommendations to the Government of India. This, in terms of policy influence, was a great success.

Open-source research is not the norm in universities. Peer review is the defining characteristic of university research. But it has come to serve as a brake on the early release of ideas, lest they be thought of as half-baked. But in the new Internet-mediated world open source is a better model: Do what you do quickly and put it up on the web; the circle of people interested in your work, your true

peers, will look at it; if necessary, induce them to give you comments, though if they care about ideas enough, they will comment anyway. On some of the blog threads on the LIRNEasia website, it is possible to count over 50 useful, substantive comments. If the author is willing to revise and revise again, the end result will be superior in quality and will be produced faster than through the conventional model.

AN EXAMPLE OF CAPACITY BUILDING IN THE ASIA PACIFIC REGION

LIRNEasia is a new (2004) regional research and capacity-building organization with the mission of “improving the lives of the people of the Asia Pacific by facilitating their use of information and communication technologies; by catalyzing the reform of the laws, policies and regulations to enable those uses; by building Asia-Pacific-based human capacity through research, training, consulting and advocacy.”

The production of research is relatively unproblematic. Influencing regulatory and policy processes is more challenging (Lindblom, 1992; Weiss, 1977; Mansell et al., 2002). The truly difficult task is the building of capacity. In 2005, LIRNEasia launched a systematic, multipartner, and long-term initiative to build capacity essential to achieving the desired objectives. This is, in essence, a field-building exercise that draws from previous experience in establishing ICT policy research capacity in developed markets, but addresses the different circumstances of the emerging Asia Pacific region, and hopefully the larger set of emergent economies. The networks that are associated with this activity must be distinguished from research networks per se. In LIRNEasia’s usage, certain kinds of centrally coordinated research networks, like its own, are virtual organizations. The networks associated with field building must necessarily be looser than research networks.³

Critical to field building is a process that is open and participatory to a much greater extent than is feasible in, or appropriate for, a lean, emergent organization such as LIRNEasia. An organization, virtual or otherwise, must have focus and priorities; entry must be selective; and values must be held in common. A network, on the other hand, must give primacy to accommodating multiple interests and parties and must not have rigid entry/exit barriers. In other words, distinguishing between an output-driven, focused organization such as LIRNEasia and a process-focused and open network that is necessary for field building is central to the success of achieving the second (and arguably longer lasting) branch of LIRNEasia’s mission statement.

If the objective is to create or facilitate policy intellectuals capable of informed and effective intervention in ICT policy and regulatory processes in specific country

contexts, it is not enough to recruit or “repurpose” an elite group of tightly organized researchers. There should be a sustainable system for producing and reproducing such policy intellectuals. This requires the active participation of universities, especially at the postgraduate levels, and the emergence of a field, constituting the larger environment within which university-based programs flourish, both in terms of the essential function of peer review and in terms of intellectual exchange and support. Given the shallow depth of the intellectual environments in most countries of the emergent Asia Pacific region, this requires supranational field building.

The emergence of fields is something that happens or is actively done. LIRNEasia has chosen to engage in active field building, based on its analysis of the needs of the region. The fastest method of field building requires the participation of high-quality universities, the buy-in of senior and respected academics, and money, as demonstrated by the Ford Foundation and the Social Science Research Council (New York) in their successful field building initiatives. Money is short in the present instance and so are the other ingredients. Another difference in the U.S. environment is the presence of scholarly networks prior to the commencement of field-building initiatives. So, for example, the Telecom Policy Research Conference (TPRC) relied on existing networks among economists, policy scientists, and communication scholars in its field building or sustaining activities.

In the case of ICT policy and regulation research in the Asia-Pacific, there was very little to start with. A search for authors from developing Asia with publications in telecom reform (Gamage & Samarajiva, forthcoming) demonstrated that:

- There was a dearth of Asian ICT policy and regulation researchers.
- The quality of their output could be higher.
- The researchers lacked adequate SSCI (Social Science Citation Index) and web presence.

A further knowledge mapping of these researchers in terms of their coauthorships and citations revealed that they were not adequately connected to each other in Asia through either citations or coauthorships.

- The majority (or 58%) of authors are not cited.
- Of all the citations received, most citations come from the developed world (74%) or from their own country (16%), with only 7% of the citations from other countries in Asia (Figure 6).
- Almost all authors had one or more coauthorships.
- Of all the coauthorships, 77% were from within their own country, 19% from developed countries, and 3% other Asian countries (Figure 7).

Based on this analysis, LIRNEasia is initiating a systematic approach to field building, starting from a more

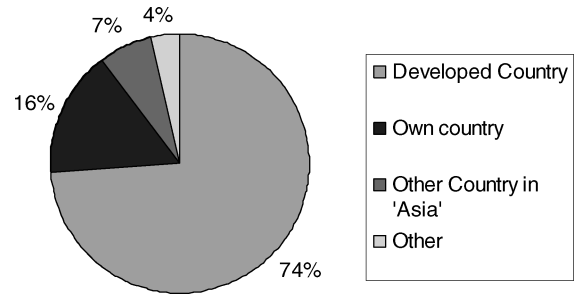


FIG. 6. Scholarly relationships of Telecom policy and regulation researchers in East, South, and Southeast Asia as evidenced by scholar.google citations, August 2005. Source: scholar.google.com accessed August 2005; Keywords were *telecom* and its variants and name of each country in East, South, and Southeast Asia. The total number of researchers with telecom policy and regulation related publications is 353.

thorough and comprehensive knowledge mapping (using a broader sieve than was used in the first attempt and supplementing the previous methods with questionnaires to elicit information on young scholars and graduate students who were previously excluded) and centered around an annual research conference that will provide a focus for intra-Asia-Pacific (and later, intra-South) connections among scholars engaged in ICT policy and regulation research and an institutional archive for research.

LIRNEasia will provide the required support at the outset, but the governance of the conference and the associated field-building activities will be in the hands of a self-perpetuating but changing board of directors (modeled on TPRC). The model of conventional academic associations is inappropriate for the task at hand. They are democratic in nature (office bearers elected by members) and are sustained by payments from members

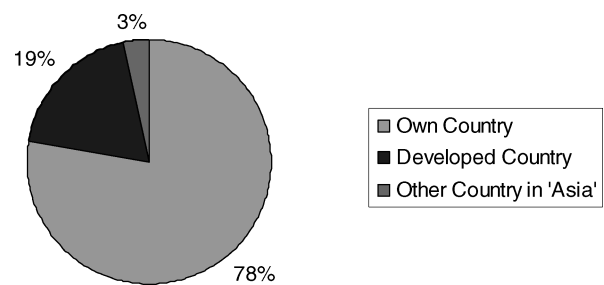


FIG. 7. Scholarly relationships of telecom policy and regulation researchers in East, South, and South east Asia as evidenced by scholar.google coauthorship, August 2005. Source: scholar.google.com accessed August 2005. Keywords were *telecom* and its variants and name of each country in East, South, and Southeast Asia. The total number of researchers with telecom policy and regulation related publications is 353.

and subsidies from universities and other organizations that employ the members. However, this model tends to yield highly diffused conferences with low quality control, which are not conducive to field building.

The inaugural CPR_{south} event, "CPR_{south} 1: Research for Improving ICT governance in the Asia-Pacific," was held in Manila, supported by the International Development Research Centre of Canada and in collaboration with the National College of Public Administration and Governance, University of the Philippines, Diliman, in January 2007. CPR_{south} 2007 is modeled to some extent on the Communication Policy Research Conferences in Europe and the United States.⁴ Active researchers were recruited beforehand to organize and chair sessions (senior) and present papers (junior). In TPRC and Euro CPR (communication policy research), its European counterpart, the tradition is to limit the number of papers strictly and to privilege plenary sessions over parallel sessions. CPR_{south} adopted similar practices to ensure optimal contribution to field building.

While the focus was on the Asia Pacific region, observers were invited from Africa and Latin America, in the hope of broadening the scope of the event in the near future. The institutionalization of CPR_{south} includes the adoption of a governing charter (already done), a web site for self-archiving of publications and conference papers (in process), and a business plan for sustaining the organization and the conference.

CONCLUSION

Bridging the digital divide is important. It may not be as important as ensuring safe water for all, or adequate health care, in terms of meriting investment of scarce public resources, but it is definitely important enough to merit concerted action to remove the artificial barriers to private supply. This article marshals some evidence to argue that one of the best ways to remove barriers is to improve ICT policy and regulation capacity.

Reforms are best served by creating an environment within which international best practices are adapted to local circumstances by in situ policy intellectuals. Some of these local experts could be in regulatory agencies and in government; but optimal results will be achieved through participatory processes where all stakeholders, including consumers, are represented by knowledgeable experts.

The experts need to work in a networked context, making optimal use of the Internet and related technologies to engage in just-in-time learning and open-source research. Communication Policy Research—South (CPR_{south}), a new multipartner and multicountry initiative launched in early 2007, intends to create the conditions for sustaining existing capacity and building new capacity.

NOTES

1. <http://web.worldbank.org/external/projects/main?pagePK=642-83627&piPK=73230&theSitePK=40941&menuPK=228424&Projectid=P042263> and <http://web.worldbank.org/external/projects/main?pagePK=64283627&piPK=73230&theSitePK=40941&menuPK=228424&Projectid=P077586> (accessed September 17, 2006).

2. Final text at: http://www.lirneasia.net/2005/03/national-early-warning-system/and_draftat:http://www.lirneasia.net/wp-content/Concept%20Paper%20Feb05_01.pdf (accessed August 11, 2006) Comparison of draft and final text will show how much weight was given to the comments.

3. Indeed, it may be hypothesized that research on research networks has been bedeviled by conflation of scholarly networks (associated with field building or maintenance), research networks and virtual organizations. See Stein et al. (2001), Hildreth and Kimble (2004), Monge and Contractor (2004), Shiffrin and Borner (2004), and Wind (2005).

4. On Euro CPR, see <http://www.encip.org/eurocpr.php>. TPRC's origins are documented by Owen (1997).

REFERENCES

- BBC. 2005. Mobile phone riot in Bangladesh. *BBC* March 31. http://news.bbc.co.uk/2/hi/south_asia/4398493.stm (accessed August 11, 2006).
- Central Bank of Sri Lanka. 2005. *Annual report 2005*. Colombo: Central Bank of Sri Lanka. <http://www.centralbanklanka.org/Content.htm> (accessed September 17, 2006).
- Cronin, F. J., Colleran, E. K., Parker, E. B., and Gold, M. A. 1991. Telecommunications infrastructure and economic growth: An analysis of causality. *Telecommunications Policy* 15(6):529–535.
- Cronin, F. J., Colleran, E. K., Herbert, P. L., and Lewitzky, S. 1993a. Telecommunications and growth: The contribution of telecommunications infrastructure investment to aggregate and sectoral productivity. *Telecommunications Policy* 17(9):677–690.
- Cronin, F. J., Colleran, E. K., Parker, E. B., and Gold, M. A. 1993b. Telecommunications infrastructure investment and economic development. *Telecommunications Policy* 17(6):415–430.
- Fink, C., Mattoo, A., and Rathindran, R. 2002. *An assessment of telecommunications reform in developing countries* (Policy Research Working Paper 2909). Washington, DC: Development Research Group, World Bank. http://www-wds.worldbank.org/servlet/WDS-ContentServer/WDSP/IB/2002/11/11/000094946_02102904035023/Rendered/PDF/multi0page.pdf (accessed August 11, 2006).
- Gamage, S., and Samarajiva, R. Forthcoming. From Capacity to presence: Enhancing the usability of university research in the Internet age. Information Technology for International Development. (<http://www.lirneasia.net/2006/10/usability-of-university-research-in-the-internet-age/>).
- Hardy, A. P. 1980. The role of the telephone in economic development. *Telecommunications Policy* 4(4):278–286.
- Hildreth, P., and Kimble, Chris. 2004. *Knowledge networks: Innovation through communities of practice*. Hershey, PA: Idea Group.
- International Telecommunication Union. 2002. *Effective regulation case study: Botswana*. <http://www.itu.int/itudoc/igs/promo/bdt/cast-reg/79121.html> (accessed August 11, 2006).
- International Telecommunication Union. 2005. *The Internet of things*. Geneva: ITU

- Lane, B., Sweet, S., Lewin, D., Sephton, J., and Petini, I. 2006. *The economic and social benefits of mobile services in Bangladesh: A case study for the GSM Association*. London: Ovum.
- Lindblom, C. E. 1992. *Inquiry and change: The troubled attempt to understand and shape society*. New Haven, CT: Yale University Press.
- Mansell, R., and Wehn, U., eds. 1998. *Knowledge societies: Information technology for sustainable development*, Oxford: Oxford University Press, published for the United Nations Commission on Science and Technology for Development.
- Mansell, R., Samarajiva, R., and Mahan, A., eds. 2002. *Networking knowledge for information societies: Institutions and intervention*. Delft: Delft University Press. <http://www.lirne.net/resources/netknowledge/index.htm> (accessed 11 August 11, 2006).
- Melody, W. H. 2002. *The triumph and tragedy of human capital: Foundation resource for building network knowledge economies*. Inaugural Address as Vodacom Visiting Professor of ICT Policy and Regulation at the University of Witwatersrand, Johannesburg, South Africa. <http://link.wits.ac.za/papers/wm20020918.htm> (accessed August 11, 2006).
- Menou, M., ed. 1993. *Measuring the impact of information on development*. Ottawa: IDRC.
- Monge, P. R., and Contractor, N. S. 2004. *Theories of communication networks*. New York: Oxford University Press.
- Nasarullah, N. 2004. Stampede over free cell phones. *The Dawn* August 22. <http://www.dawn.com/2004/08/22/fea.htm> (accessed August, 11, 2006).
- Owen, B. M. 1997. A novel conference: The origin of TPRC. In *Telephony, the Internet and the media, Selected papers from the 1997 Telecommunications Policy Research Conference*, eds. J. K. MacKie-Mason and D. Waterman, 1–14. Mahwah, NJ: Lawrence Erlbaum Associates. <http://www.tprc.org/TPRC.HTM> (accessed August 11, 2006).
- Samarajiva, R. 1995. Review 2 [Review of the book *Measuring the impact of information on development*]. *Journal of the American Society for Information Science* 46(1):75–77.
- Samarajiva, R. 2000a. The role of competition in institutional reform of telecommunications: Lessons from Sri Lanka. *Telecommunications Policy* 24(8/9):699–717. <http://www.comunica.org/samarajiva.html> (accessed August 11, 2006).
- Samarajiva, R. 2000b. Establishing the legitimacy of new regulatory agencies. *Telecommunications Policy* 24:183–187.
- Samarajiva, R. 2002. *Effective regulation: Trends in Telecommunication Reform 2002*. Geneva: International Telecommunication Union. <http://www.ituarabic.org/arabbook/2004/GTTR-2002.pdf> (accessed August 11, 2006).
- Samarajiva, R. 2004. Sri Lanka's telecom reforms of 2002–03, *SAFIR Newsletter* 17: 5–9. <http://www.safir.teri.res.in/newslet/issue17.pdf> (accessed August 11, 2006).
- Samarajiva, R. 2005. Making the most of submarine cable connectivity for Bangladesh. *Daily Star* December 6. <http://www.thedailystar.net/2005/12/06/d512061501104.htm> (accessed August 11, 2006).
- Samarajiva, R., and Dokeniya, A. (with S. Fernando, S. Manikkalingam, & A. Sanderatne). 2005. Regulation and investment: Sri Lanka case study. In *Stimulating investment in network development: Roles for regulators*, eds. A. K. Mahan and W. H. Melody, 141–76. Monte Video: World Dialogue on Regulation. <http://www.regulateonline.org/content/view/435/31/> (accessed August 11, 2006).
- Shiffrin, R. M., and Borner, K. 2004. Mapping knowledge domains. *Proc. Natl. Acad. Sci. USA* 101(suppl. 1):5183–5185.
- Stein, J. G., Stren, R., Fitzgibbon, J., and MacLean, M. 2001. *Networks of knowledge: Collaborative innovation in international learning*. Toronto: University of Toronto Press.
- Weiss, C. 1977. Research for policy's sake: The enlightenment function of social research. *Policy Analysis* 3:531–545.
- Wind, T. (2005). Sustainability of IDRC supported networks. Ottawa: IDRC. http://www.idrc.ca/uploads/user-S/11564503801Highlight_3.pdf#search=%22T%20wind%20%20IDRC%20sustainability%22v (accessed October 20, 2006).
- World Bank. 1999. *World development report 1999*. Oxford: Oxford University Press.