Networked Readiness and Small Island Developing States[*]

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May 2002

Abstract

There is great optimism that information and communications technologies (ICTs) and elevated levels of Networked Readiness will alleviate many historical challenges that developing countries face by facilitating access to greater market opportunities and information. Small island developing states (SIDS) are generally better off than the rest of the developing world in terms of some elements of their Networked Readiness such as ICT buildout and diffusion. Among other major obstacles, however, SIDS continue to lag in telecommunications liberalization. There is growing evidence that SIDS are pooling resources to take a regional approach in areas such as telecommunications regulation, natural resource management, maritime surveillance, and distance learning. Greater coordination of responses to the development challenges of SIDS has also been enhanced through ICTs. More extensive macro-level data and more informed and systematic micro-level analysis of how SIDS are applying ICTs to their unique development challenges, including isolation and natural resource management, is necessary to gain a more complete understanding of how underlying drivers of ICT adoption are related to overall trends.

Introduction

The last decade of technological innovation and growth, marked by the rapid development and deployment of powerful information and communication technologies (ICTs) such as the Internet, has sparked great interest and discussion of the potential of these technologies to enhance economic opportunity in underdeveloped and isolated communities globally. Global dialogue of the role of "ICTs for Development" has become a major programmatic strand of rhetoric and activity to help developing countries jumpstart economic growth. More specifically, the factors involved in bolstering Networked Readiness and translating Networked Readiness into greater economic competitiveness have become the focus of key questions by policy and business leaders.

Relative to other developing countries, Small Island Developing States[1] (SIDS) have exhibited strong ICT growth, especially over the past five years, in some cases surpassing average levels of key Networked Readiness variables for developing countries as a whole. While a fully robust Networked Readiness analysis of SIDS remains somewhat inhibited due to data limitations, there is rapid adoption of ICTs by SIDS overall, and growing evidence of the use of ICTs to address the unique issues that small island developing states face.

Networked Readiness

As greater attention has been paid to the role that ICTs can play in the economic development process, broad consensus has emerged as to the similar set of challenges around the Networked World that both developing and developed countries face. The concept of Networked Readiness, which has been defined as the "the degree to which a community is prepared to participate in the Networked World,"[2] provides a summary conceptual measure of how communities can assess their own ability to participate in the Networked World.

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[1] There are varying definitions of small island developing states. For the purposes of this paper, SIDS are defined to be non-high income countries with a population less than 1.5 million people, plus the Dominican Republic, Cuba, Haiti and Jamaica.

[2] Networked Readiness was first conceptually developed in 2000 by the Information Technologies Group at the Center for International Development at Harvard University. See *Readiness for the Networked World: A Guide for Developing Countries*, [online] at http:www.readinessguide.org for more details on Networked Readiness.

The pursuit of Networked Readiness is a complex undertaking with a wide range of impacts upon economy and society, as ICTs are a multi-faceted tool that affect how information flows in almost every conceivable human interaction, whether it be the buying and selling of products, the delivery of health care, education and learning, or interpersonal communication and entertainment. Likewise, the factors that influence a community's Networked Readiness are complexly intertwined and far-ranging. The education of citizenry, the speed and quality of information infrastructure, the regulatory environment, the business and economic context, and the cost to deploy and use ICT networks all contribute to Networked Readiness. More specifically, the global challenges to Networked Readiness include:

- *Network Access*. Access to adequate network infrastructure is a prerequisite to Networked Readiness. The availability and affordability of use of communication networks, the hardware and software needed to interface with the network, the quality and speed of information infrastructure, and the customer service orientation of network providers are all essential aspects of the usability of ICTs.

- *Network Policy*. Government policies that affect access, cost and use of the networks are of paramount importance in shaping the Networked World, as are a variety of other factors such as perceived political risk, predictability of the legal environment, soundness of economic and monetary policies, openness to foreign direct investment, convertibility of local currency, restrictions on capital laws, credit card usage, credit card processing protocols, access to credit, entrepreneurial culture, access to startup capital, and regulations and restrictions on small businesses.

- *Networked Society and Learning*. People need to be adequately trained to use ICTs, and the incorporation of ICTs into formal and non-formal education systems plays an important role in preparing an ICT-literate workforce.

- *Networked Economy*. The ways in which people, businesses, government and other organizations are using ICTs determine the utility of ICT networks.

In dealing with these same sets of Networked Readiness challenges that all countries face, small island developing states have shown great progress in recent years. While reliable data are not available for all aspects of Networked Readiness in SIDS, a number of key trends can be identified through examination of the telecommunications indicators of the International Telecommunications Union. There is also more anecdotal evidence of ICT adoption and use through the SIDS community that helps to bolster analysis contained in the *Global Information Technology Report 2001-2002: Readiness for the Networked World.*

Network Access

In the past five years, most SIDS achieved at least some level of connectivity, although several small island developing states in the South Pacific were among the last countries in the world to get connected. The typical issues of rural-urban discrepancies in ICT access are prevalent in SIDS, as in other developing countries, and the challenges of providing connectivity to far-flung islands in cases where SIDS are made up of archipelagoes or groups of islands remain; however, on average, SIDS appear to be better off in terms of the average buildout and per capita user base of information infrastructure than developing countries in general. The cost of access still remains a major obstacle. In all available measures of network access, the SIDS, just as the rest of the developing world, on average lag well behind developed countries.

Extent of Access (the Information Infrastructure)

Fixed line telephony. Analysis of basic telephony indicators, still among the most important in terms of understanding a community's information infrastructure, shows that the average per capita figures of both fixed and cellular telephones in SIDS exceeds that in the rest of the developing world. As can be seen in Figure 1, the average number of fixed line telephones per 100 inhabitants in SIDS lagged behind other developing countries as late as the early 1980s. Since 1987, however, the number of main telephone lines per capita has exceeded that of the rest of the developing world, and the margin has continued to increase. While any one particular reason for this relative rapid growth in SIDS is hard to determine, anecdotal evidence suggests that the extreme pent-up

demand for telephone service began to be better alleviated by a spurt of network buildout in the late 1980s and early 1990s. The more attractive cost structure of building fixed line networks in urban versus rural areas, given the economics of higher population density that can utilize the networks, also may explain the relative growth in small islands with high urban populations, in comparison with the rest of the developing world where rural populations make up a greater overall percentage national population.

Figure 1: Average Main Telephone Lines per 100 inhabitants
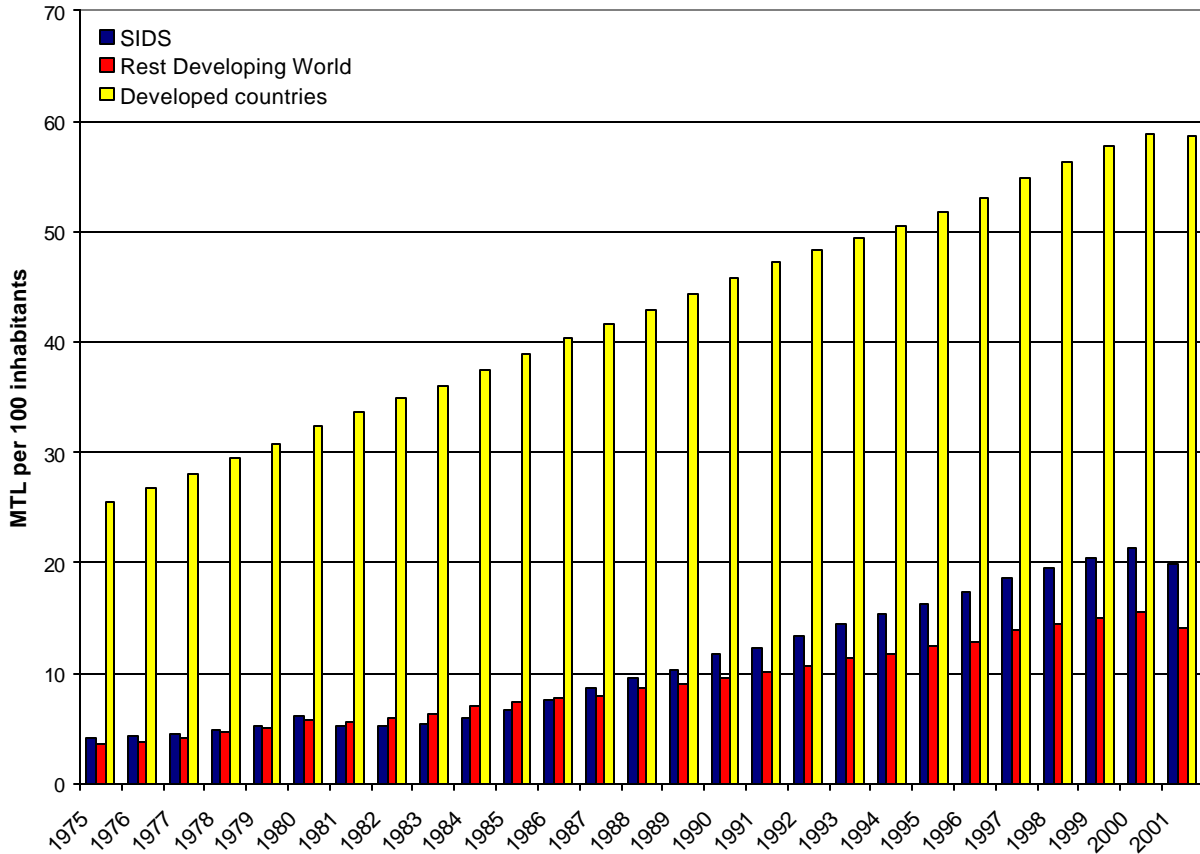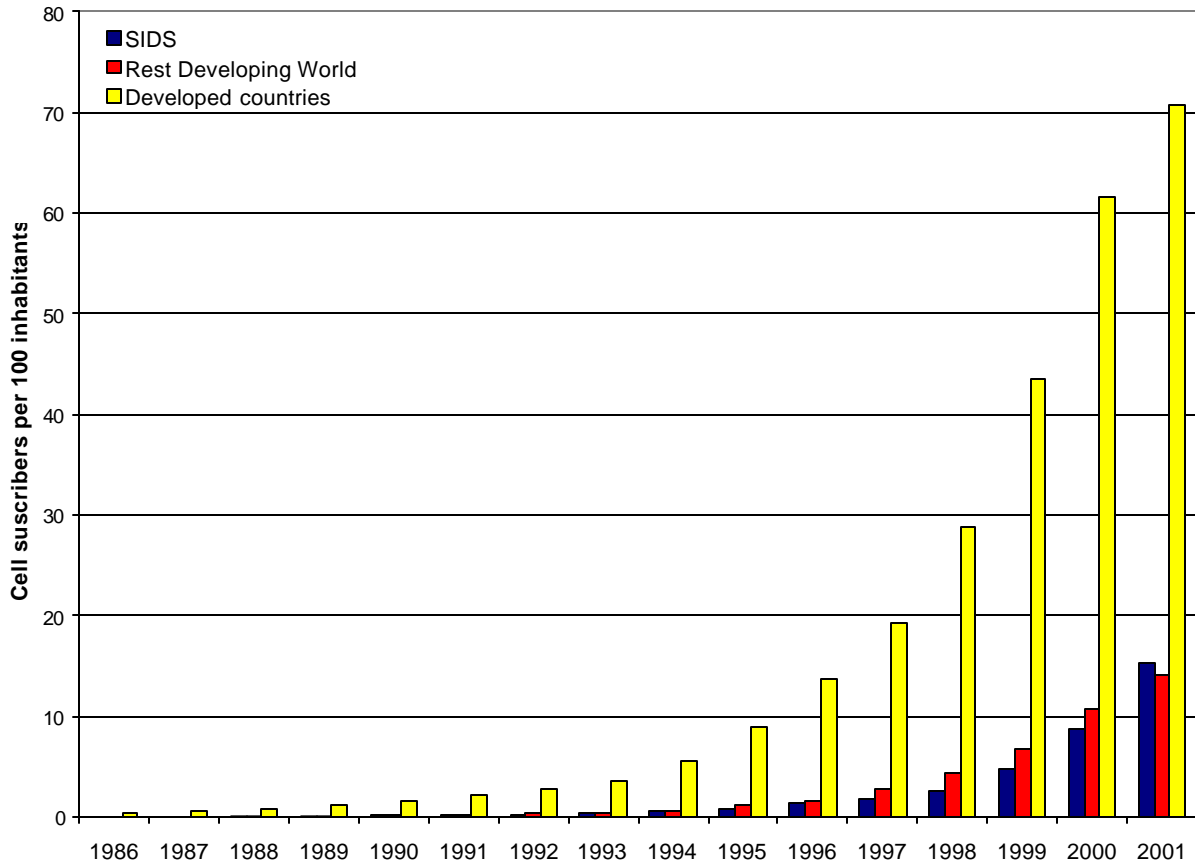

Source: ITU, 2002.[3]

Cellular Telephony. A similar pattern can be seen in cellular telephony, albeit more exaggerated and at a later date. As depicted in Figure 2, there has been an explosion in mobile cellular telephony in the developing world since the mid-1990s, particularly in small island developing states, where per capita cellular usage surpassed the developing world in general in 2001. Given

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[3] Countries considered in the SIDS sample from 2002 ITU data are listed in the Appendix of this paper.

the lower costs of network deployment, the faster activation rates, and the convenience and flexibility that mobile cellular networks offer the consumer, in light of the limited resources and high urban population densities in many small island developing states, it is not surprising that mobile cellular technologies have taken off in SIDS.

**Figure 2: Average Cellular mobile telephone suscribers per 100 inhabitants**

Source: ITU, 2002.

Overall telephone penetration. While separate analyses of fixed line and cellular telephony are useful in demonstrating a more nuanced understanding of network access, it is important to also consider telephony access in its totality. As can be seen in Figure 3, it can be seen that the overall performance of the SIDS in comparison to the rest of the developing world again shows the great strides that small island developing states have made over the past several decades, with a nine-fold increase in per capita telephone subscription between 1975 and 2001. As the convergence of computational and wireless communication technology continues, an understanding of the total

access provided by hybrid networks will continue to be essential in understanding how these networks can be used.

**Figure 3: Average Total Telephone Suscribers per 100 Inhabitants**
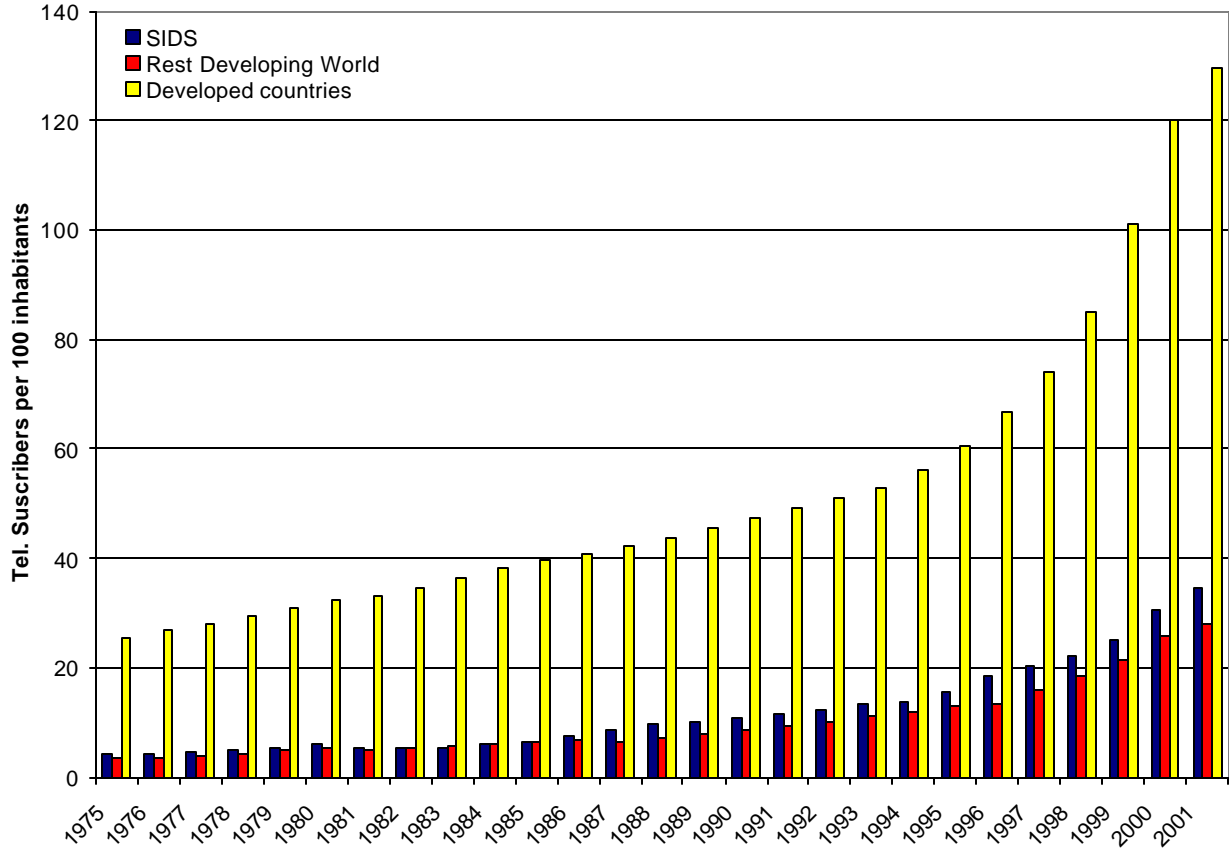
Source: ITU, 2002

The continuing rapid decreases in cost and increases in bandwidth of wireless ICT solutions should greatly help the particular networking challenges of archipelagoes and groups of islands. Given basic line-of-sight needs for most wireless solutions, traditional physical barriers to establishing Internet and telephony connectivity across bodies of water should be greatly alleviated. For example, 802.11 wireless broadband, which has rapidly become a standard technology throughout the U.S. and Europe, can be deployed over a distance of 30 miles with clear line-of-sight. Wireless technologies could be ideally suited for the connectivity needs of far-flung island groups, given a central connectivity hub.

The quality of access

The overall quality of fixed line telephone networks in small island developing states has also improved significantly since the early 1990s, although the constant pattern of improvement is less clear than the continuing expansion of the network. As can be observed in Figure 4, as of 2000, the number of faults per line in the fixed line network were at about half the level of their peaks in 1990 and 1996, in which there were more faults than lines. There are no available data on issues of external connectivity to small island states – given the physical challenges of connecting islands to global networks across expanses of water, it would be useful to analyze not only internal measures of network quality, but also data concerned with the quality of international gateways and overall island connectivity. Certainly those island economies that fall in the footprint of geostationary satellites or that act as landing points for undersea cables would seem to have an inherent advantage over other less fortunately situated islands.

Figure 4: Telephone Faults per 100 main lines
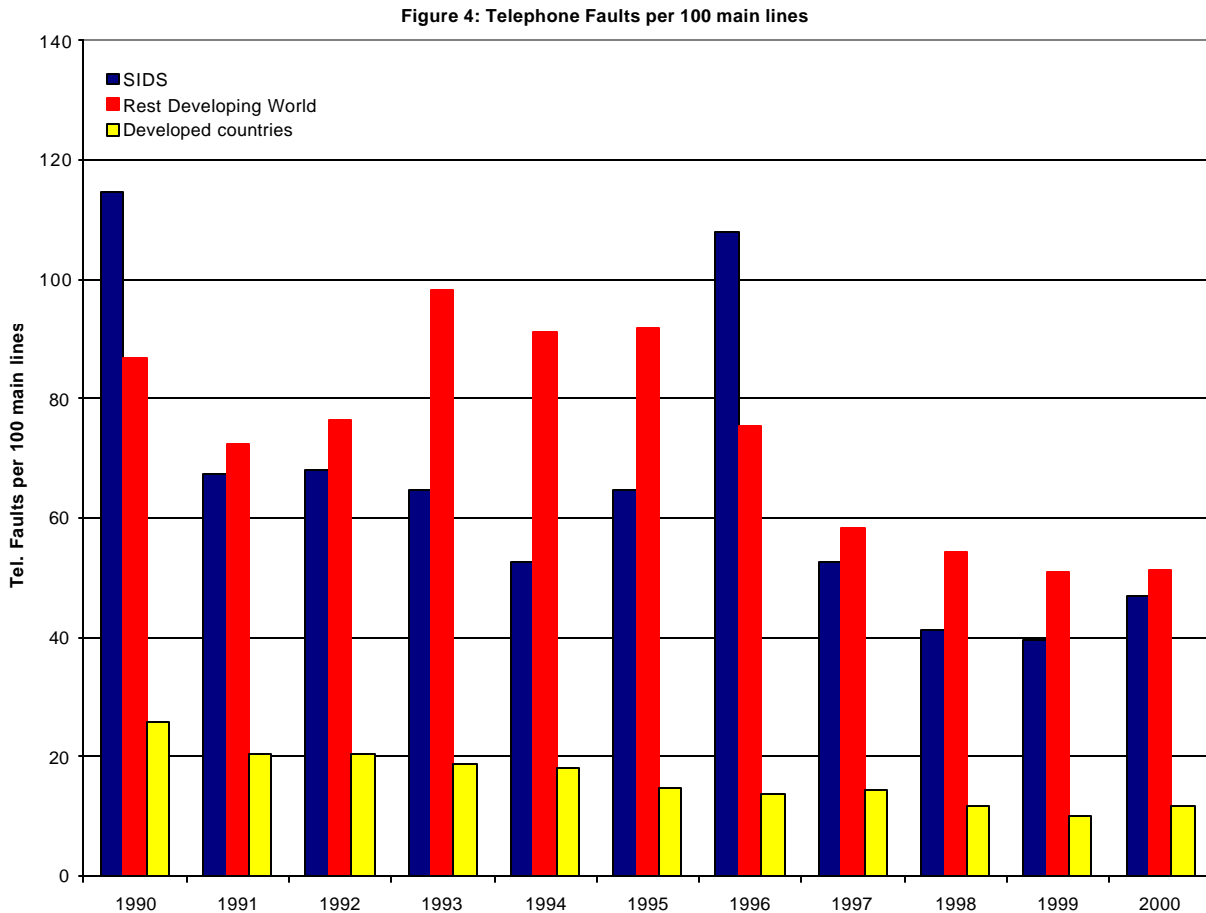
Source: ITU, 2002.

Internet access

As has been the case with cellular telephony, the Internet has also exploded throughout the developing world; this has been especially true for the small island developing states.   Relative numbers of both Internet hosts and users have shown rapid growth in SIDS.   In the case of Internet hosts, as illustrated in Figure 5, there was remarkable growth between 2000 and 2001 in SIDS, leaving small island developing states with over twice as many Internet hosts per capita as is the average in the rest of the developing world.   It would be very useful to know more about the drivers of this growth in hosts, and whether this growth has occurred in commercial, government, non-profit or academic activities.

Figure 5: Average Internet hosts per 10.000 inhabitants
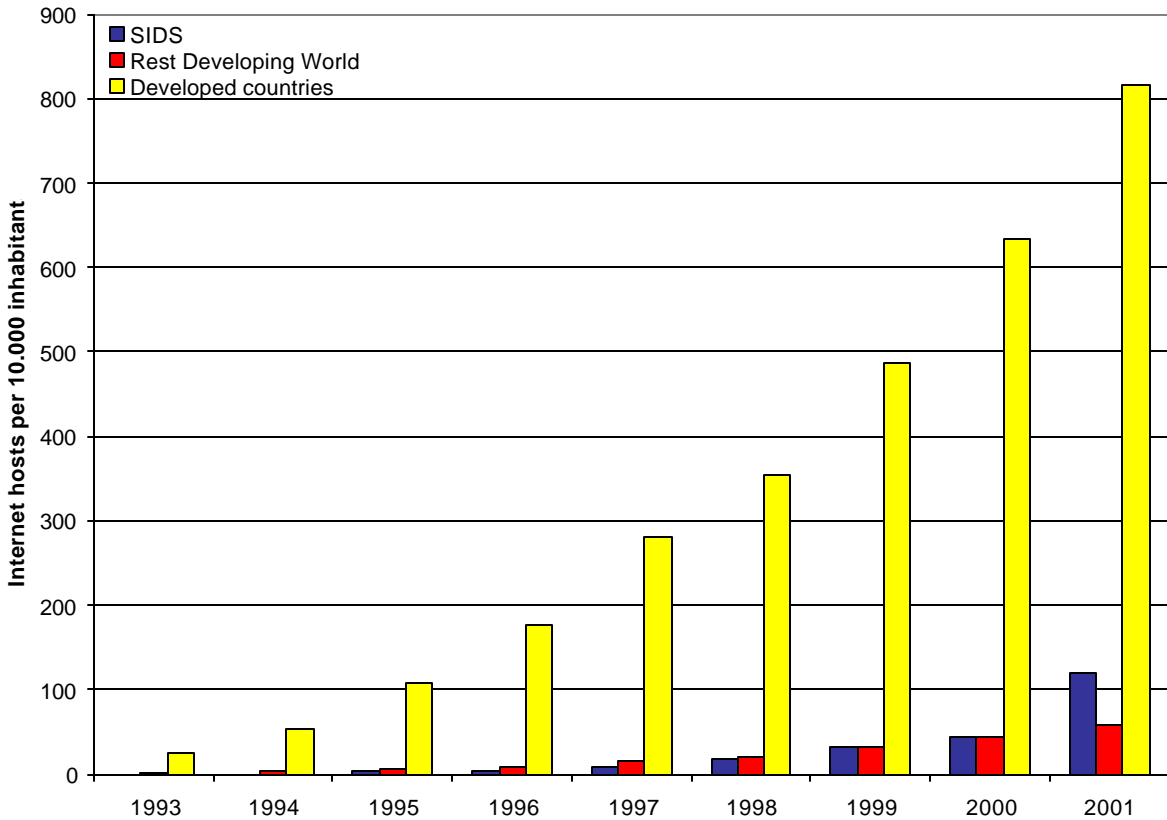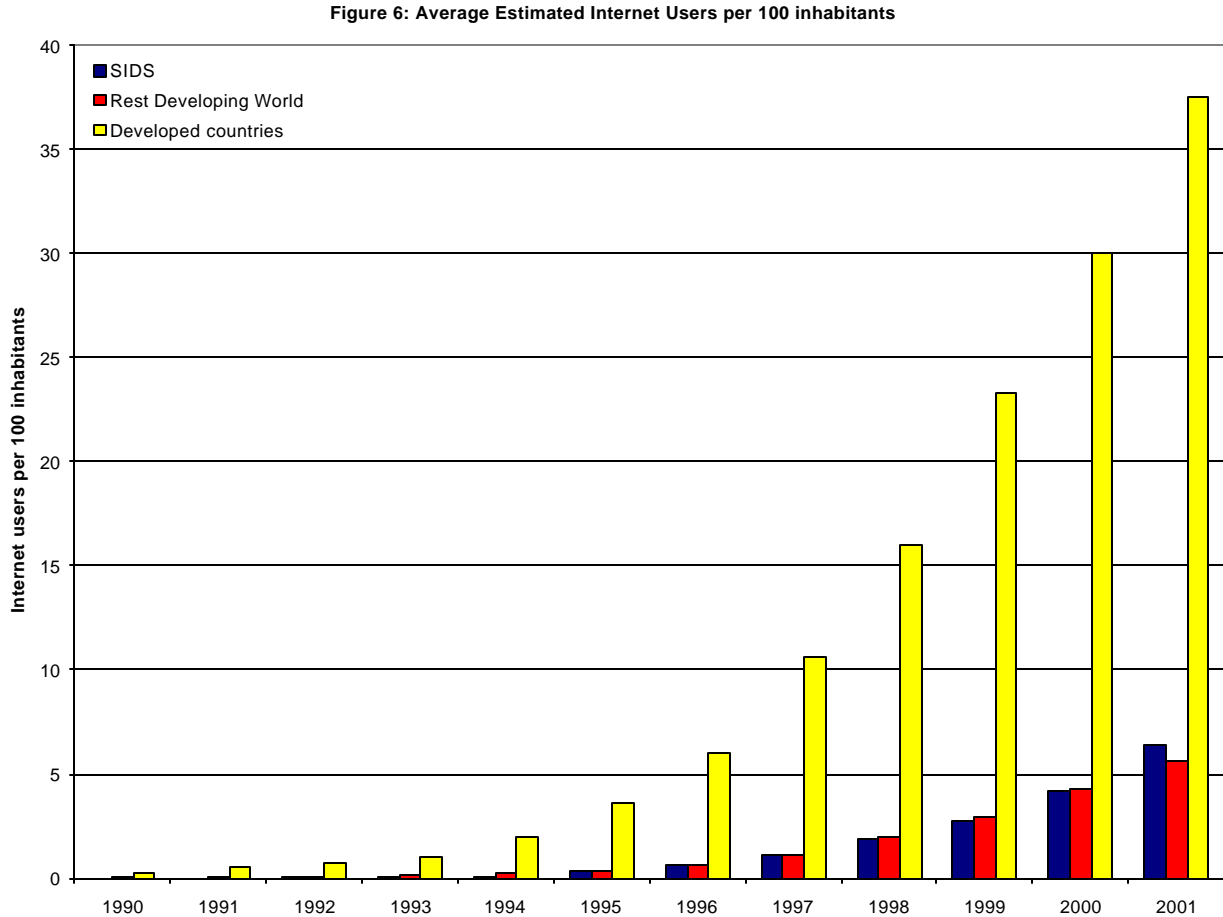

Source: ITU, 2002.

The user base for the Internet has also increased drastically in the past few years in small island developing states.   Although Internet usage is dwarfed by that in developed countries, as depicted in Figure 6, the average percentage of the population of SIDS who used the Internet rose

above 6 percent in 2001, slightly above that of the rest of the developing countries. Again, the nature of this growth of Internet users would give great insight into linking macro level trends of Internet usage with the on-the-ground reality.

Figure 6: Average Estimated Internet Users per 100 inhabitants

Source: ITU, 2002.

There are growing numbers of government, NGO and private sector initiatives within small island developing states to extend Internet access to more of their population, particularly in rural and underserved areas. In Jamaica, the government has launched an ambitious strategy to use post offices and other public venues to provide Internet access to its citizens. In the Dominican Republic, the government has established the LINCOS program that uses a telecenter model to provide holistic telephone/Internet/computer facilities to previously underserved areas, and Codetel, the dominant telecommunications operator, has launched the AVE program to provide small computer laboratories housed in trailers to public schools. As in other parts of the developing

world, these initiatives have had both success and failure. While simple access to ICTs has been beneficial to many users, these programs add to the strong historical evidence that shortcomings in training, management, financial and technical planning detract from the overall impact of ICTs.

Figure 7: Cost of Residential Average Monthly Telephone Subscription (fixed portion)
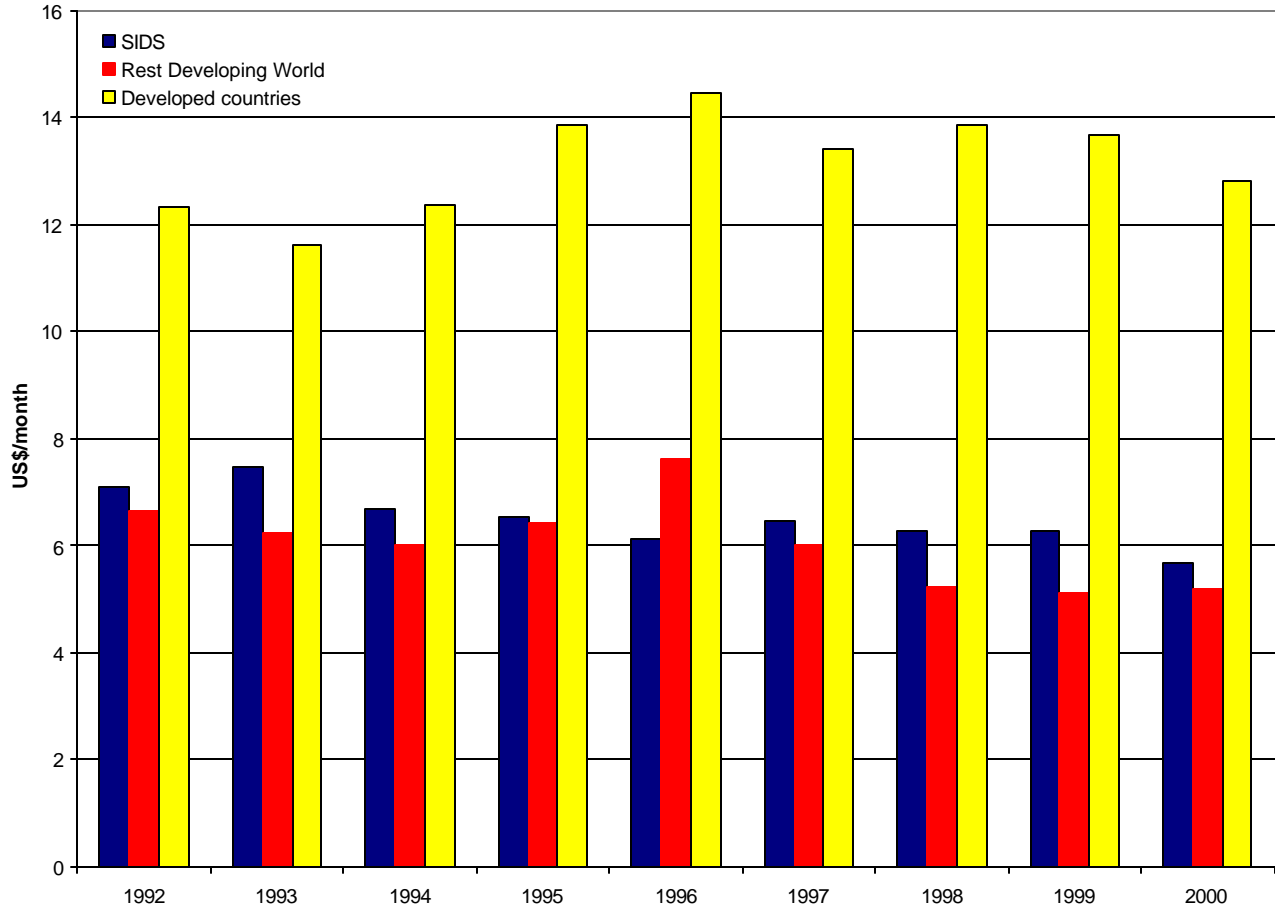
Source: ITU, 2002.

The Cost of Network Access

The data suggest that one of the stronger impediments for small island developing states is the relatively high cost of access. As shown in Figure 7, the cost of the fixed portion of monthly telephone charges has for the past decade, with the exception of 1996, consistently remained above the average for the rest of the developing world. Although the costs of telephone access remain significantly higher in the developed nations, it is important to keep in mind the higher per capita incomes in those countries as well; in other words, the real cost of access is lower in developed countries. While this telephone charge is only one of a number of costs that make up

total Internet access cost, it serves as an important indicator of the overall affordability of the network, and a likely pointer to an area of policy that should perhaps be reexamined. It is likely that the PC computer will remain the primary means by which most users in the world access the Internet for some period of time into the future. As a result, high costs of telephone access not only inhibit telephone usage, but also for the Internet for those who connect via a dial-up modem.

Network Policy

One of the most important areas of concern in planning in the Networked World is the policy environment, especially as it relates to telecommunications regulation as a major driver of both the extent and cost of network access. Within small developing island states, the issue of regulation lies at the core of primary challenges to Networked Readiness. Monopolies have tended to persist longer in small islands than in many other groups of countries. As can be seen in Table 1, across all telecommunications markets, there is a greater incidence of monopoly than throughout the rest of the world.

Table 1: Level of Competition Across Telecommunications Markets in Small Islands vs.the Rest of the World

	Small Islands				Percentages			
	Monopoly	Duopoly	Competition	Total	Monopoly	Duopoly	Competition	Total
Local Telephony	27	1	0	28	96.43%	3.57%	0.00%	100.00%
National long distance	26	1	0	27	96.30%	3.70%	0.00%	100.00%
International long distance	27	0	1	28	96.43%	0.00%	3.57%	100.00%
Analog cellular	16	0	6	22	72.73%	0.00%	27.27%	100.00%
Digital Cellular	10	0	5	15	66.67%	0.00%	33.33%	100.00%
Leased Lines	21	1	2	24	87.50%	4.17%	8.33%	100.00%
Paging	9	0	10	19	47.37%	0.00%	52.63%	100.00%
Mobile Satellite Market	7	0	5	12	58.33%	0.00%	41.67%	100.00%
Fixed Satellite Market	15	1	4	20	75.00%	5.00%	20.00%	100.00%
Cable TV Market	6	1	7	14	42.86%	7.14%	50.00%	100.00%
GMPCS Market	2	0	3	5	40.00%	0.00%	60.00%	100.00%
ISP	3	0	6	9	33.33%	0.00%	66.67%	100.00%
	Rest of the World				Percentages			
	Monopoly	Duopoly	Competition	Total	Monopoly	Duopoly	Competition	Total
Local Telephony	94	18	44	156	60.26%	11.54%	28.21%	100.00%
National long distance	108	11	36	155	69.68%	7.10%	23.23%	100.00%
International long distance	102	16	37	155	65.81%	10.32%	23.87%	100.00%
Analog cellular	53	11	56	120	44.17%	9.17%	46.67%	100.00%
Digital Cellular	37	28	74	139	26.62%	20.14%	53.24%	100.00%
Leased Lines	78	10	55	143	54.55%	6.99%	38.46%	100.00%
Paging	24	9	95	128	18.75%	7.03%	74.22%	100.00%
Mobile Satellite Market	25	12	60	97	25.77%	12.37%	61.86%	100.00%
Fixed Satellite Market	46	13	55	114	40.35%	11.40%	48.25%	100.00%
Cable TV Market	16	7	76	99	16.16%	7.07%	76.77%	100.00%
GMPCS Market	8	5	44	57	14.04%	8.77%	77.19%	100.00%
ISP	10	3	75	88	11.36%	3.41%	85.23%	100.00%

Source: *Trends in Telecommunications Reform*, International Telecommunications Union, 2000.

The impact of these monopolies upon price should not be underestimated – empirical studies have shown again and again the essential role that liberalization can play in making the Internet and basic telephony services more affordable, and improving the service quality.

The unique situation of small islands, with their small consumer markets, limited private sectors, dominant public sectors, lack of economies of scale, and paucity of regulatory expertise has created special challenges that have stalled regulatory reform processes. The question of how many service providers can survive in such small markets has also been a major concern among reform advocates. In at least one instance, among five countries in the Eastern Caribbean (St. Lucia, Dominica, Grenada, St. Vincent and the Grenadines, and St. Kitts and Nevis), there has been an attempt to approach telecommunications regulatory issues from a regional perspective, rather than on a national island-to-island basis.[4] The creation of a regional telecommunications regulatory authority, the Eastern Caribbean Telecommunications Authority (ECTA), provides technical expertise to coordinate national regulations within each island state.

A number of international organizations, including the World Bank, United Nations Development Programme, Asian Development Bank and others, have recognized the special challenges and needs of small island developing states in the regulatory area, and have designed training programs and technical assistance specifically geared toward policymakers in these environments.

Networked Learning and Society

Education, and the role of ICTs in the educational process, remain major challenges throughout the developing world. The typical obstacles of curriculum reform, teacher training, ICT maintenance, sustainable financing models, and technical skills transfer that all countries face are no less prevalent in small island developing states. In the Dominican Republic, for example, the government in 2000 constructed over 300 computer laboratories in secondary schools in order to

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[4] "The Organization of Eastern Caribbean States and regional telecommunications reform," in the Report of the Commonwealth Secretariat/World Bank Joint Task Force on Small States, Washington DC and London, April 2000.

introduce ICT skills into the national educational program. While ambitious, the initiative has been plagued by all of the above-mentioned issues. The widening split between technical skills training in public and private schools that is observed in the Dominican Republic is not uncommon among other SIDS.

For some small island developing states that lack the financial resources of economies of scale to maintain extensive educational infrastructure, a regional approach to education, tapping into the distributive power of ICTs, has been explored. ICTs have facilitated communication and information flows in the sub-group of small island states that are made up of island groups, atolls or dispersed islands. In the South Pacific, the University of the South Pacific (USP) has developed a distance learning program that delivers coursework via satellite through the university's USPnet to half the student body who are distributed among its 12 member island states.[5] By sharing the financial burden and moving away from a face-to-face learning model, USP has been able to extend its educational reach.

In the area of health, there are growing examples of innovative ICT programs that directly address the unique needs of isolated SIDS by allowing health practitioners to tap into medical and health expertise that they may not have locally. For instance, in the South Pacific, tele-health facilities for the Cook Islands have been based in New Zealand, and for the Marshall Islands and the Federated States of Micronesia in Hawaii.[6]

Networked Economy

In consideration of some common economic traits of SIDS and industry groups typical of small island economies, there are at least three basic strategies that small island developing states have taken, either in tandem or separately, in terms of using ICTs for greater economic gain. First, the Internet and other ICTs are being used to strengthen existing small island industries such as tourism, textiles and fishing. Second, there are growing applications of ICTs that both enhance

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[5] The University of the South Pacific's 12 member nations are the Cook Islands, Fiji Islands, Kiribati, Marshall Islands, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu. [online] at http://www.usp.ac.fj/.
[6] Asian Development Bank Outlook 2001, [online] at http://www.adb.org/Documents/Books/ADO/2001/pacific.asp.

economic strategy and address essential natural resource management issues. Third, SIDS have sought to create new sources of competitive advantage through the nurturing of information or service based industries whose existence is made feasible specifically by ICTs.

In terms of using ICTs to augment the competitiveness of existing industries, the use of the Internet in the tourism sector is perhaps the most visible. With the increasing reliance by tourism operators, individual tourists and travel agents on the Internet for their business needs, competitive Internet strategies have become a marketing and logistical necessity for small island developing states to compete successfully in tourism. Both small domestic tourism enterprises as well as multinational tourism companies are investing heavily in technology as an enabler for their businesses.

In the textiles industry, ICTs have become a major source of competitive advantage as global supply chains have become more integrated and just-in-time processes have become essential to maintaining profit margins. In SIDS ranging from Mauritius to the Dominican Republic to Fiji, the textile industry is among the most advanced within each country in terms of ICT adoption, as these industries are highly exposed to international competitive pressures.

The use of ICTs in the fishing and other maritime industries is also on the rise, and some interesting models uniquely suited to the realities of SIDS have developed. In the South Pacific, remote sensing technologies are being utilized as an aid to fisheries management and maritime surveillance as well as long-range environmental planning.[7] The South Pacific Forum Fisheries Agency (FFA) has successfully established a vessel monitoring system (VMS) using satellite technology[8] in which 14 independent Pacific small island states use ICT-based tuna tracking systems that aid in the management of tuna fishing, the reduction of illegal fishing and an increase in overall revenue, all on a cost recovery basis with a VMS fee paid by tuna fishermen.[9] By using the technology as a tool among 14 states, these countries were able to pool their resources and leverage the technology to create both a regional resource management platform and a more efficient fishing industry.

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[7] [online] at http://www.sidsnet.org/pacific/usp/macs/research/sea/remote.htm
[8] [online] at http://globaled.ausaid.gov.au/secondary/casestud/south_pacific/2/tuna.html

Some small island states have turned their economic hopes to the development of call centers or other offshore information services. There are a number of elements that need to be in place for the successful development of these industries, including: reliable electricity supply; adequate telecommunications bandwidth and quality; educated labor force; appropriate language skills; political and economic stability; time zone alignment; and a conducive business environment. With the growing mobility of capital and services, the international marketplace for investment in information services has become extremely competitive, and the establishment of all the requisite conditions for the development of offshore service industries is extremely challenging for most SIDS.

Nonetheless, there are a number of efforts by governments in SIDS to harness ICTs for job creation and the jumpstarting of new information-based industries. The Fiji Islands Trade and Investment Bureau prominently markets its county as an ideal destination for back office information export industries, and devotes considerable space on its website to the telecommunications and service virtues of the country as an investment destination for the industry.[10] The Australian airline Qantas set up a ticket processing facility in Fiji that provided 200 jobs. In the Dominican Republic, the government inaugurated in 2000 the Instituto de las Américas, a high tech campus near the Santo Domingo airport meant to attract IT firms and to provide training in computer science and engineering. In Barbados, some success has been found in attracting back office financial operations from New York.

It is essential for decision-makers in SIDS to keep in mind that the new technologies do not extend these economic possibilities only to small island developing states, but indeed, to all countries, and that in the growing competitive global marketplace, many initiatives are underway across many countries to bolster existing sources of competitive or comparative advantage with ICTs as well as to enter or better compete in information-based service industries. SIDS have yet to become major players in the global information services market, when compared to major national successes such as the Philippines and India, not in the least because they lack the scale of

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[9] Proceedings of Workshop on ICT Strategies for Islands and Small States, March 17-19, 2002, Malta, [online] at http://www.comnet.mt/Isiwkshp/iswreport/nreposu.rtf.

population. However, the offshore information services market continues to grow rapidly, and should continue to provide great opportunities to those SIDS that can develop niche advantages that can yield positive economic results. Business leaders and policymakers alike need to stay up-to-date on the newest technologies and need to move quickly to exploit sectoral opportunities.

The small private and relatively large public sectors in SIDS require government leadership and action in the area of ICTs. There are growing numbers of government-led initiatives in small island states to harness ICTs for economic growth, and ICT planning has clearly risen on the agendas of small island governments. The government of Malta took a proactive stance on ICTs by developing as early as 1992 a National Strategy for Information Technology within the Malta Council for Science and Technology (MCST) – this strategy focused on improving ICT infrastructure, business opportunities and education.[11] Other ICT-related activities led by the Maltese government have included YouthNet 2000, an Internet-based initiative that linked local and international NGOs.[12] The government of Papua New Guinea in 2000 established a national Information Technology Board Strategic Plan to incorporate ICTs into national economic planning.[13] And numerous other SIDS governments see ICTs as a priority for their national development.

Harnessing ICTs for the challenges of small island developing states

In the global dialogue about small island developing states, there has been some degree of optimism that ICTs such as the Internet offer a powerful way to overcome the historical challenges that small islands face. The theoretical case for the impact of ICTs on small states has been in the literature, though primarily as a footnote within larger discussions of the impact of ICTs upon global politics and society.[14] For the subset of countries that make up the SIDS, a set of common challenges has been identified that ICTs could help address. Small islands (as well as small states

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[10] "Fiji Islands Trade and Investment Bureau, Industry Profile: GENERAL SERVICES; [online] at http://www.ftib.org.fj/pr_general.htm#backoffice.
[11] Proceedings of Workshop on ICT Strategies for Islands and Small States, March 17-19, 2002, Malta, [online] at http://www.comnet.mt/Isiwkshp/smalsts.htm..
[12] Ibid.
[13] Asian Development Bank Outlook 2001, [online] at http://www.adb.org/Documents/Books/ADO/2001/pacific.asp.

more generally) face a common set of development challenges that have been well documented in the literature. These include:

- remoteness and insularity;

- susceptibility to natural disasters;

- limited institutional capacity of the public sector;

- limited diversification of production and exports;

- vulnerability to external economic and environmental shocks;

- limited access to external capital; and

- poverty.[15]

While ICTs are not a panacea for all the development challenges that small islands face, there is some belief that ICTs may provide tools to directly alleviate their isolation and small markets.[16]

In their pivotal article in *Foreign Affairs* in 1998, Nye and Keohane argue that small states may see the most gain in the information age through the enhancement of their "soft power."[17] In contrast to the history of past centuries, in which the "hard power" of military and political dominance of a few states were the prime features of the international political system, the advent of ICTs globally should lead to greater acceptance of states who can use information and communication channels to establish persuasive criteria for their own issues. Indeed, there is some evidence that soft power is being altered for small island developing states through ICTs, in the sense that solutions to the special development challenges and needs of SIDS are being better coordinated through ICTs. Although small island developing states make up almost 30 percent of the developing country community and about 5 percent of the global population,[18] historically it has been challenging to coordinate development strategies for SIDS, not to mention unify common SIDS views in venues such as the United Nations and the World Bank.

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[14] For example, see Keohane, Robert and Nye, Joseph; "Power and Interdependence in the Information Age," *Foreign Affairs*, v.77, no.5, September/October 1998 or Cairncross, Frances; *The Death of Distance*, Harvard Business School Press, Boston, MA, 1997.

[15] "What makes small states different?" in *Small States: Meeting the Challenges in a Global Economy,* Report of the Commonwealth Secretariat/World Bank Joint Task Force on Small States, Washington DC and London, April 2000, p.2.

[16] SIDSnet: Small Island Developing States Network, [online at http://www.sidsnet.org].

[17] Keohane and Nye, 1998.

[18] Alliance of Small Island States, [online] at http://www.sidsnet.org/aosis/.

There has been a major groundswell of organized use of ICTs to facilitate discussion and coordination among policymakers and development actors in small island states. Following the 1994 Barbados Programme of Action, in which a SIDS unit was established within the United Nations Development Programme,[19] SIDSnet, an "island development portal," was created. SIDSnet provides an area online where the SIDS development community can focus discussion of issues such as sustainable tourism, biodiversity, marine and coastal resource management, energy, trade and climate change as they affect small islands.

The Internet has also provided a tool for distinct expert groups in small island states to share information and resources and to create regional or coordinated planning efforts related to small island issues. Issues ranging from the cataloguing of endangered bird species of the Eastern Caribbean to the sharing of agriculture and economic challenges in the Pacific Rim have been more effectively discussed and coordinated through the World Wide Web and the Internet.

Small Islands within the Networked Readiness Index

In the context of the *Global Information Technology Report 2001-2002: Readiness for the Networked World (GITR)*, a joint publication of the Center for International Development at Harvard University and the World Economic Forum, the first Networked Readiness Index (NRI) was created as a measure to capture national capacities to reap the benefits of ICT networks. The NRI provides shorthand for the numerous factors that must be considered when discussing national Networked Readiness. More specifically, the NRI defines national Networked Readiness as the summary of enabling factors that must be present for a nation to generate use of ICT networks and Network Use itself.[20] For the first time, the NRI provides an aggregate measure of the Networked Readiness of 75 countries that are found in a wide range of economic strata, geographic location, size and makeup.

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[19] In 1994 the United Nations convened a conference in Barbados that focused on the specific development challenges of SIDS.

[20] For a more detailed explanation of the construction of the Networked Readiness Index, please see the Technical Appendix for Chapter 2, Kirkman, Osorio and Sachs, "The Networked Readiness Index: Measuring the Preparedness of Nations for the Networked World," in Kirkman (Ed.) et.al., *The Global Information Technology Report 2001-2002: Readiness for the Networked World (GITR)*, Oxford University Press, 2002, pp. 26-29.

Of the 75 countries included in the *GITR* and the NRI, five are considered to be small island states in the context of this paper: the Dominican Republic, Iceland, Jamaica, Trinidad and Tobago and Mauritius. Of these five countries, only Iceland is not a SIDS. Given the small sample of small island nations treated within the *Global Information Technology Report*, it is difficult to generalize about the global experience of small islands regarding Networked Readiness, but the in-depth treatment of these island countries within a major international study should flag the potential for future inclusion of more small island developing states in major international ICT benchmarking exercises.

A cursory comparison of the overall performance of these five small island economies in the NRI reveals a clear demarcation in these countries' Readiness – Iceland ranks extremely high in the NRI, second overall (just behind the United States), while the Dominican Republic, Jamaica, Trinidad and Tobago and Mauritius all are grouped in the bottom half of the Index, within ten places of one another.

Table 2: Rankings of Small Island States on 2001-2002 Networked Readiness Index[21]

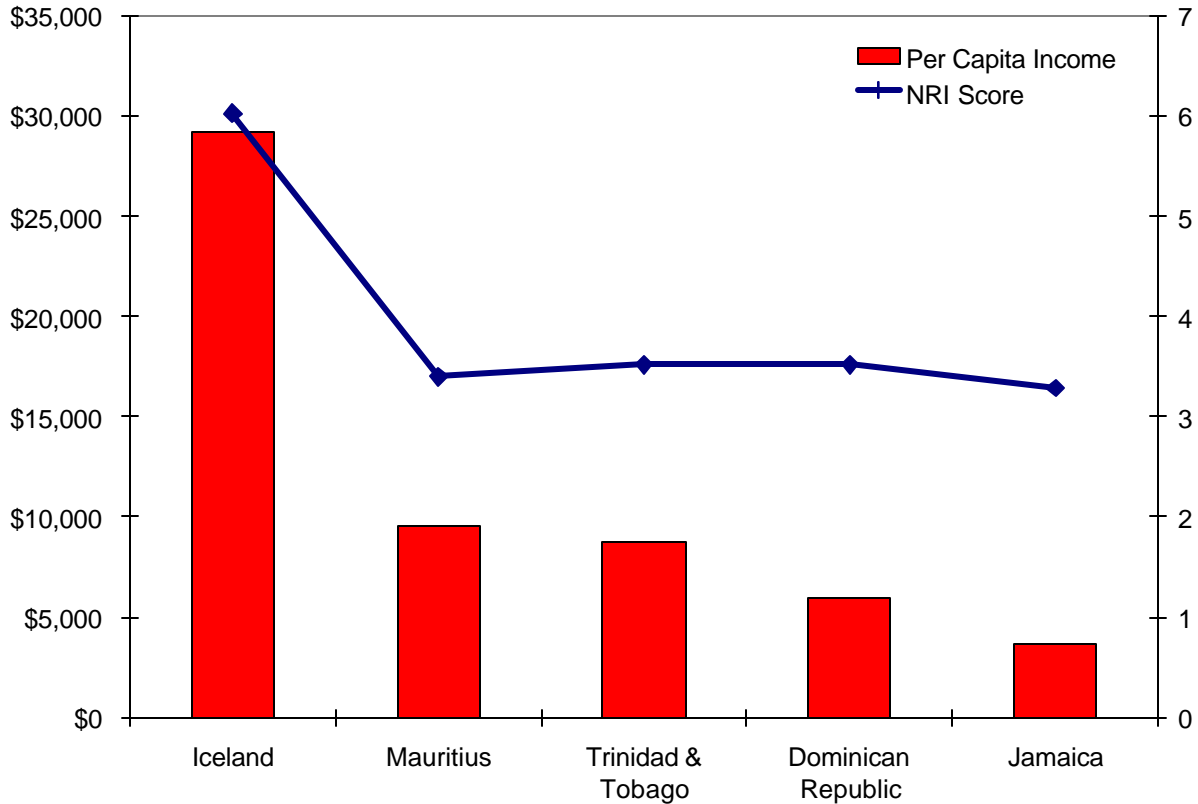| Country	Rank on Networked Readiness Index
Iceland	2
Trinidad & Tobago	46
Dominican Republic	47
Mauritius	51
Jamaica	56

Source: *GITR*, 2002.

These findings are indicative of the correlation between Networked Readiness and income. As a high income country, Iceland was able to make the requisite investments in infrastructure rollout. As can be seen in Figure 8, there is a rough, approximate relationship between the per capita income of Iceland, Mauritius, Dominican Republic, Jamaica and Trinidad & Tobago and their scores on the Networked Readiness Index, although findings from the *GITR* suggest that

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[21]*GITR*, p. 11.

Networked Readiness is not only driven by income, but affected by other factors as well, including telecommunications policy, ICT in the educational system, cost and availability of access, etc.

Figure 8: Per Capita Income and Networked Readiness Scores for five Small Island States

Source: Global Information Technology Report 2001-2002: Readiness for the Networked World

Key research questions emerge from even this cursory discussion of these islands' performance on the Networked Readiness Index:

- How do factors other than income account for the difference in performance of these five countries?

- Are there lessons specific to their status as small island states that Mauritius, Trinidad & Tobago, the Dominican Republic and Jamaica can learn from Iceland's demonstrated leadership in Networked Readiness?

As our understanding of Networked Readiness is enhanced in the future, it is hoped that more definitive answers to these and other questions will result. One of the big challenges is the lack of data, not just around small islands, but around developing countries in general.

Conclusion

Small island developing states have shown leadership in the developing world in areas of Networked Readiness specifically associated with network access and infrastructure buildout over the past decade. There has been strong growth of fixed line and cellular telephone use and the development of an Internet user base has also been robust relative to the rest of the developing countries. SIDS continue to be laggards in both the cost of access and telecommunications liberalization.

There are examples in small island developing states of innovative uses of ICTs to enhance economic opportunity and to address their unique development needs. Efforts to use ICTs are known in traditional SIDS industries such as fishing, tourism and textiles, as well as burgeoning cross-sectoral initiatives that combine natural resource management with business opportunity. Governments and businesses alike are taking advantage of ICTs to strengthen competitive advantage in small island developing states.

To develop a better analytical understanding of how ICTs are being adopted and used in SIDS, better data are needed on both macro level trends and micro level drivers of ICT use. In comparison with the documentation of many areas around the world, there is relatively little information available from international and domestic statistical agencies about ICTs in SIDS. And to capture how SIDS are participating in the Networked World, a more complete understanding of how businesses, in particular, are using ICTs is necessary. A number of interesting research strands arise from this preliminary analysis of Networked Readiness and SIDS – it is hoped that other researchers will take up these important questions.

Appendix

List of small countries included in analysis of 2002 ITU World Telecommunications Indicators Database:

- Antigua and Barbuda

- Bahamas

- Bahrain

- Barbados

- Cape Verde

- Comoros

- Cuba

- Cyprus

- Dominica

- Dominican Rep.

- Fiji

- Grenada

- Haiti

- Jamaica

- Kiribati

- Maldives

- Malta

- Micronesia (Fed. States of)

- Saint Kitts and Nevis

- Saint Lucia

- Samoa

- Sao Tome and Principe

- Seychelles

- Solomon Islands

- St. Vincent and the Grenadines

- Tonga

- Trinidad and Tobago

- Vanuatu

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