Current Status of Information Technology 
And Its Issues in Sri Lanka

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1. Introduction

Information Technology has come to the revolution in every field of human activity including the way we live and work. There is at least one product involving the use of information technology, including washing machine, microwave, computer and many others. With the rapid growth of Information technology and introduction of internet, we now will be able to order good, reserve seat, arrange anything from our personnel computer no matter where we are.

Broad access to information communication technology is key for people to understand, participate and respond to the challenges that development poses to civilization. Understanding of issues such as global warming, loss of biodiversity, evolution, implications of genetic research, and many other topics are essential, almost a requisite, for personal involvement in these issues. They affect all of us, and the better we understand them, the better we can respond with appropriate actions, whether these are activism in public causes or changes at the personal level. In the developed countries, access to information is wide spread. A visit to a decent bookstore provides an enormous amount of possibilities. Libraries, particularly university libraries, can be the most appropriate places. The advent of electronic information, particularly the World Wide Web and other means of global information access, has multiplied the ways in which people can obtain information.

2. Introduction of ICT in Developing Countries

The modern world is undergoing a fundamental transformation as the industrial society of the twentieth century rapidly gives way to the information society of the twenty-first century. This dynamic process promises a fundamental change in all aspects of our lives, including knowledge dissemination, social interaction, business practices, political engagement, media, education, health, leisure and entertainment.

The speed of global technological and economic transformation demands urgent action to turn the present digital divide into digital opportunities for all. A discussion about the allocation of resources is imminent if we look at the connectivity of the Internet in developing countries. One way to measure the digital divide is to monitor the penetration of telephone subscribers and Internet users, as well as literacy rates in developing countries. Poor access to the Internet in Sri Lanka is widely acknowledged.

3. Sri Lanka as a Case Study

The Democratic Socialist Republic of Sri Lanka is a small island situated in the Indian Ocean, off the southeastern coast of
India. It is an independent member of the Commonwealth of Nations. Colombo is the largest city and the commercial capital of Sri Lanka, while the administrative capital is Sri Jayawardenapura-Kotte. This section summarizes the developments and current status of educational media in Sri Lanka.

3.1 The Land and the People

Sri Lanka has a total area of 65,610 sq. km. About 80% of the island is flat land, while the south-central part of the country is mountainous. The highest point is the peak of Pidurutalagala, which rises to 2,524 m. Being situated near the equator, Sri Lanka has a hot and humid climate. It has an average annual temperature of about 32 C in the lowlands and about 21 C in the mountainous regions. The country’s estimated population was 19,576,783 in 2004. About 74% are Sinhalese (Theravada Buddhists). Minority ethnic groups consist of Tamils (18%), Moors (7%) and others (1%). Sinhala and Tamil are the official languages of Sri Lanka, while English is also widely used (The World Fact Book 2002). Government Sri Lanka is governed under the constitution of 1978. The President, who is both the Chief of the State and the Head of the Government, is elected by popular vote for a period of six years. The President appoints the Prime Minister and the members of the Cabinet. The members of the unicameral parliament are elected by popular vote. The country is divided into eight administrative provinces and 25 administrative districts, each presided over by an appointed district minister.

3.2 Socio-Economic Indicators

Sri Lanka’s economy is primarily based on agriculture, with emphasis on plantation-grown export crops such as tea, rubber and coconut. However, with changes in the Country Profiles government’s policies in 1977 to help the country be more market oriented, textiles and garments have become Sri Lanka’s largest exports since the mid-1980s, accounting for 63% of total exports. Gross Domestic Product (GDP) grew at an average annual rate of 5.5% throughout the 1990s. Yet, in 2001, due to various reasons such as civil war, power shortage, budgetary problems and global slowdown, the economy declined to a 1% growth rate. About 25% of the population live below the national poverty line. The Human Development Index is 0.751 (2003) and the Gender Development Index is 0.737 (2003). The unemployment rate is around 7.9% (2003), and this is found to be highest among educated people. Sri Lanka has a high adult literacy rate of 90.4% (2003), highest in the South Asian Region (Human Development Reports 2005).

3.3 Education System in Sri Lanka

Education is free at all levels — from the primary grades through first-degree at the university level. Free textbooks are provided to all school students. Attending school is compulsory for children from 5 to 14 years of age. Five years of primary education is followed by three years at the junior secondary level, another three years at senior secondary level and finally two years at college level. There are around 10,548 schools (government schools, private schools and temple education) in Sri Lanka, as well as are 13 universities, 14 National Colleges of Education, and about 30 technical institutions (Government of Sri Lanka 2004). Sri Lanka’s education system is predominantly a national system. It is centrally organized under the Ministries of Tertiary Education and Education, with human resource development and culture also falling under the same ministerial umbrella. Apart from the ministries of the central government, the provincial governments also have their own ministries,
which are administratively linked to the line management of the central government. The National Education Commission is the central body that looks after the national policy of education and national aims and objectives of education. Aspects such as school curriculum, teacher education and national examinations (at the GCE A-Level and O-Level, and Grade Five scholarship examinations) are held at the national level. Within provinces, the administration and management are further structured into zones and divisions, each of which is administered by a Director. The school system consists of two major categories: public/state schools and private schools. The latter include two types: schools that are not funded by the government, but in all other respects (for instance, curriculum, examinations) follow the procedures of state schools; and the International Schools, where the medium of instruction is English and both curricula and assessments are internally determined. Most international schools prepare students for foreign examinations such as London O-Levels and A-Levels. Sinhala or Tamil is the language of instruction in state schools and non-international schools. A recent development in state schools is the introduction of English as the language of instruction in one of the classes at each level. Those students who opt for English instruction are allowed to join these classes. Teacher education at the pre-service and in-service levels is totally under the Ministry of Education. Pre-service teacher education is conducted via National Colleges of Education (NCOE) and student-teachers are selected from among those students who have obtained marks above the minimum pass level to qualify for entry to university, but failed to enter due to lack of places in the universities. The teacher education system in the country is ordered under an umbrella organization called the National Authority of Teacher Education (NATE). This step was taken in keeping with a recommendation of the World Bank. Apart from the NCOEs, there are a number of teacher-training colleges still functioning as in-service teacher-training institutions. The National Institute of Education also shares in the preparation of teachers. A Bachelor of Education degree programme is conducted by NIE. In this programme, teachers are given course material for training, and practical experience is supervised and evaluated by external staff. Universities, technical colleges and technical institutions come under the Ministry of Tertiary Education. There are 13 universities spread over different parts of the country, each province having at least one. Entry to the universities is highly competitive, except in the case of the Open University. The latter has a total student enrolment — over 20,000 — that is a little more than the total number of students of all the universities. Although this is not a large number when compared with that in other countries, it should be considered with respect to the total population in the country. The Open University of Sri Lanka (OUSL), established in 1980–81, reaches its students through the distance mode, operating via a network of four regional centres and 21 study centres and teaching centres. A wide variety of study programmes, ranging from certificate courses to higher degrees, are being conducted by OUSL.

4. Education

There have been noteworthy developments in education since the recent reforms were introduced and gradually implemented with funding from the World Bank and Asian Development Bank. Significant changes were introduced in primary education, based on recommendations made by the National Education Commission (NEC). These were focused in the areas of curriculum, teaching methodology and overall philosophy of
primary education. A competency-based curriculum was introduced and efforts were made to make primary education more child-centred and activity-based (The Presidential Task Force on General Education 2000). Major changes in the curriculum at the GCE O-Level and A-Level were introduced in order to release the students from a heavy syllabi-centred and examination-oriented education. School-based assessment (SBA) schemes were introduced and teachers were given in-service training in implementing the new system. The need to make educational qualifications fit into the world of work is fully recognised. The skills development project of the Asian Development Bank has begun work in the area of improving the technical training system, making it move towards a competency-based system so that trained youth will receive recognition in the world of work, both within the country and outside (National Education Commission 1997). Introduction of computer knowledge into the school system, as well as in tertiary and higher education institutions, is a major step in moving towards new technologies. This is a significant move, though the process is slow due to resource constraints. The open university in its small way has now turned its attention towards building international links. The Youth Development programme initiated by the Commonwealth Secretariat is one such attempt, where OUSL has played a major role in preparing course material and conducting the courses. Initiatives are already being taken to internationalise the existing Master of Arts programme in Teacher Education conducted by the Faculty of Education. This programme is scheduled to reach students in some of the member countries in the South Asian Association for Regional Cooperation region.

The concept and practice of distance education was introduced in the Sri Lankan education system during the latter half of the 1970s. The Sri Lanka Institute of Distance Education (SLIDE) was established in 1976. There were two sections in this institute: one for Mathematics, Science and Technology, and the other for Humanities and Social Sciences. The Ministry of Education had a unit in distance education established mainly to provide training to graduate teachers serving in the school system. They had not received initial training and, to address this, lesson material in print was prepared and given to them. Weekend face-to-face sessions and seminars were conducted at different centres. Practical teaching was conducted at schools. Thus, a distance teaching system for teacher education came into practice. This system of graduate teacher training continues in the Open University with the establishment of OUSL in 1980, the work of SLIDE was transferred to the institution. The Ministry of Education continued to work in collaboration with the Open University until 1985, when all the activities of the distance education unit were finally handed over to the Open University. At its inception, OUSL had more or less ready-made programmes handed over by SLIDE, the Ministry of Education, and the External Services Agency of the University of Colombo, which conducted a certificate course in professional English and a certificate course in Pre-School Education for teachers. These events marked the beginnings of distance education. During the last 20 years, the Open University expanded with four faculties: Education, Engineering Technology, Humanities and Social Sciences, and Natural Sciences (OUSL 2003). As noted above, total student enrolment in OUSL numbers around 20,000, and the outreach covers almost every part of the country. The courses vary from certificate level to higher degrees. In terms of content, distance education courses at OUSL have moved away from traditional university disciplines and opened new avenues, providing pre-school education for teachers and higher education for nurses and
teacher-educators. These programmes have become very useful for professional training and career development of the respective categories of professionals. The Ministry of Education, through the National Institute of Education, organised distance education programmes especially in the area of teacher training and education. A group of non-graduate teachers who are in schools across the island teaching Science and Mathematics receive training and updating on an ongoing basis. In addition, parallel to the open university programme, the National Institute of Education has also been running a programme for graduate teacher training since the 1980s. The distance education system in Sri Lanka has contributed greatly in the area of teacher education and training by clearing a large backlog of untrained graduate teachers who have been serving in the school system without initial training for long years. Distance education as a delivery mode for education and training while in service is now becoming more popular. Even conventional systems are now developing courses in the distance mode for selected groups of employees. For example, the Medical Faculty of the University of Colombo has already started preliminary work in this area. A non-formal organisation, Distance Education for Public Servants, is conducting a programme for public servants on a national level, aiming at capacity building and career development of civil servants. The Asian Development Bank is stepping in to launch a programme to modernise the secondary education system in Sri Lanka. It is hoped that this project will boost the distance education approach considerably, playing a significant role in expanding opportunities for meaningful human resource development and preparing youth to transition smoothly into the world of work. In 2001, the World Bank assisted the establishment of a Centre of the Global Development Learning Network (GDLN) at the Sri Lanka Institute of Development Administration to address the training needs of managers. The centre is owned by the government and operates in collaboration with the public and private sectors to provide real-time video conference based distance learning programmes.

4.1. Telecommunications

In 1991, the telecommunications Department of was transferred to a government-owned corporation called Sri Lanka Telecom Corporation (SLT). Nippon Telegraph and Telephone Corp (NTT), the Japanese telecommunications giant, bought 35% of SLT shares in 1997 and took over all of SLT’s management. Today, SLT operates Sri Lanka’s domestic and international telecommunication services. Over the years, with the advances in the telecommunications field, SLT has taken steps to upgrade and strengthen the telecommunications infrastructure in the country. Strategies such as expanding the optical fiber network and applying new digital technologies have contributed to greater reliability and efficiency. According to 2001 data, there were 704,095 telephones in Sri Lanka. In Colombo and other major cities, waiting time has been completely eliminated, but in rural areas some inadequacies remain. Despite that, public phone facilities have been provided in all parts of the country. International dialling facilities are provided by SLT to 219 countries, with direct connections to 51 countries. Web-based services such as e-mail and access to the Internet are also provided through SLT Net. It had 33,208 Internet customers by 2001. The services provided include PSTN dial-up at 56 kbps, ISDN dial-up at 64 kbps and 128 kbps, Internet Leased Line services at 64 kbps, 128 kbps, 256 kbps, 512 kbps and 2Mbps, client mail server installations and Web hosting (Sri Lanka Telecom 2001). Other than SLT, there are a number of private telecommunications service...
providers, cellular mobile telephones, pay phones, trunk telecommunications network, radio paging service and trunk radio network. Mobile cellular phone services, which started in 1989 (a first amongst South Asian countries), continue to grow very rapidly. The number of cellular connections, which stood at 1,800 in 1991, increased to 667,662 in 2001. Phone charges per minute are comparatively high. Domestic phone rates continually increase, and vary from zone to zone, while IDD rates have decreased slightly in recent years. Cellular phone rates are also high, but have declined gradually due to intense competition. Restructuring of telecom services started in 1995, and since then steps have been taken to privatise SLT in stages, opening for foreign investment and with the intention of making the services more efficient.

4.2. Internet and Computer Networks

Internet usage has grown steadily in Sri Lanka in the recent past. In 2001, there were 121,500 Internet users in Sri Lanka. Since 1995, when the Lanka Internet Services initiated commercial operations, the industry of Internet Service Providing has grown exponentially. SLT started its Internet service facility in 1996. At present there are over 20 Internet Service Providers (ISPs), including SLT and private companies. The services of ISPs cover a wide geographical area, and Internet connectivity and e-mail software are readily available. Despite this fact, the high costs involved (and especially the huge increases in local call charges) limit use of the facility by a majority of the population. Currently, most of the Internet usage is in the commercial sector. Although government initiatives have attempted to provide Internet facility and access in schools and other educational institutions such as the National Colleges of Education, its use is minimal due to prohibitive cost. According to the Telecommunications Regulatory Commission of Sri Lanka (TRCSL), the total number of Internet accounts was 61,532 in 2001. Gunawardene and Wattegama (2003) estimate approximately 300,000 Internet users in Sri Lanka. Industry data show that subscribers to Internet and e-mail services grew by 52% during 2001 (Central Bank 2002). The Lanka Educational Academic and Research Network (LEARN) is a facility that interconnects educational and research and development institutions throughout the country. Initiated in 1990 as a project by the Department of Computer Science and Engineering (CSE) at the University of Moratuwa, it provided LEARNmail, the first e-mail service in Sri Lanka. Now administered by the Institute of Computer Technology at the University of Colombo, with technical operations being carried out by the CSE at the University of Moratuwa, it provides e-mail, dial-up and dedicated Internet connections to member institutions (Government of Sri Lanka 2001)

5. IT in School Education

Since 1983, the Ministry of Education and Higher Education has taken steps to familiarise and encourage school children in the use of IT. Initially, computers were provided to some schools in 1984. Later, in 1994, Computer Resource Centres (CRCs) were set up in a number of schools with the assistance of the Asian Development Bank. The main objective of setting up CRCs was to provide basic computer literacy to students — during their vacations once they had taken the GCE O-Level and A-Level examinations, and after they had left school. In 1999 and 2002, a small number of computers were supplied to selected schools in all provinces. This was done with the intention of implementing the “activity room” concept, where students of junior secondary level (Grades 6–9) were to be familiarised with computer use. Despite all
these attempts, a significant impact was not observed as expected. IT was not integrated into the formal school curriculum. The major emphasis seemed to be on hardware supply for schools rather than on IT education. Realising this shortcoming, with the intention of obtaining optimum advantage from funding and other resources, a National Policy on Information Technology in School Education (NAPITSE) was prepared by the IT unit of the Ministry of Education and Higher Education, and was approved in 2002. This policy includes a six-year strategic plan from 2002 to 2007, which is divided into three stages. Focusing on two main aspects — use of IT in education (learning and teaching) and use of IT in management of the education system — the strategic plan is being implemented under four major themes: curriculum development, human resource development, physical/infrastructure development and support initiatives development. As a result of NAPITSE, a subject called General Information Technology was introduced to GCE A-Level classes (Grade 12) after June 2002, and it is expected IT will be introduced as an optional subject for GCE O-Level classes after 2003. It was also decided that IT should be used as a tool in the teaching and learning of various subjects, from primary to advanced level classes (Government of Sri Lanka 2002). In implementing government policy, the National Institute of Education plays a major role in curriculum development and human resource development. Syllabi on General Information Technology (GIT) and Computer Assisted Learning (CAL) courses for GCE A-Level and GCE O-Level classes have been developed, and GIT for GCE A-Level is already being implemented. Teacher training is taking place, with about 700 A-Level teachers trained up to now and more than 5,000 teachers to be trained. In addition, the IT unit of NIE has also been involved in software development since 1988. Under various foreign-funded projects, the Ministry of Education is currently taking several measures to enhance IT facilities in schools. For instance, under the World Bank funded General Education Project II, planning is underway to provide 400 schools island-wide with ICT centres, equipped with 10 computers each and other accessories, as well as Internet facilities. The pilot project, in which ICT centres were established in 80 schools, was implemented in 2001 and was evaluated in 2003. The initiative was found to be providing the opportunity for students and teachers to develop basic competencies in the use of IT in education; and, despite various constraints, all schools are attempting to make the best possible use of the centres (Karunanayaka et al. 2003). The Secondary Education Modernisation Project currently being implemented with the support of the Asian Development Bank intends to develop computer literacy and narrow the digital divide. During 2001–2006, about 2,300 schools will receive 10–20 computers; and the project envisages improving access for an additional 5,000 poor students annually, by upgrading 1,000 existing schools (Reddi and Sinha 2003).

6. IT in University and Higher Education

The National Policy on IT made several recommendations to enhance IT in university education. These included providing IT awareness to all undergraduates, establishing campus-wide networks in all universities, providing Internet access to all, and introducing computer science courses. These are being implemented in all universities of the country, at various levels. For instance, OUSL offers many programmes of study including IT courses, ranging from certificate level to master’s degrees. Of special note is the Master of Arts in Teacher Education programme where IT courses are offered to teacher-educators. Steps are also being taken to offer such courses to teachers.
who follow a Post-Graduate Diploma in Education. All registered students at OUSL are provided with the opportunity to undergo a basic computer awareness course, and to use the computer facilities available at the elementary computer laboratories at the Colombo Regional Centre and other regional centres. Internet facility is also provided to students free of charge at these labs and in the main library. The campus-wide computer network integrates resources such as the library and IT division. Initiatives to integrate e-learning with the existing courses are currently being implemented. The staff development centre of OUSL conducts multimedia training sessions for its staff, as well as staff from other universities. The IT division also conducts IT training sessions for staff. The Institute of Computer Technology, an independent institution established within the University of Colombo, is a well-recognised institution with modern facilities. Providing IT training for students on a large scale, it is also involved in software development and research in IT (ICT 2001). The Sri Lanka Institute of Information Technology (SLIIT) was also recently established by the Government of Sri Lanka to train IT professionals. At this institution, courses are offered in IT, development of software, and research and development in IT. The SLIIT conducts a programme of study leading to a Bachelor of Science degree in Information Technology (SLIIT 2001).

The Sri Lankan educational environment is undergoing a phase of rapid transformation with adoption of information technology at various levels. With increased need for access to quality education, as in other parts of the Asian Commonwealth, the use of electronic media and distance education have emerged as areas of prime importance. Teacher training on various educational media has been identified as one of the key approaches to integrating ICT in the classroom. At the same time, efforts to develop learning materials indigenously are ongoing at various educational institutions. It shows that educational practices and policy in Sri Lanka recognise the role of ICTs in providing access to quality education.

7. Issues in ICT as A Developing Country

The software and telecom sectors of Sri Lanka’s ICT industry, despite many problems and a relatively small size are thriving. There are nonetheless a number of significant problems facing the industry. They include lack of transparency in government acquisitions (the largest prospective client), lack of moderately priced international bandwidth, lack of trained ICT professionals and a management-class knowledgeable about ICT and a tax structure that does not reward local sales. In recent years, USAID has funded a number of projects aimed at increasing the competitiveness of various industries in Sri Lanka, and ICT is one of their prime focal points. Their ICT sector studies are well done, and their recommendations, if followed, will help guide the industry. There is some danger that they may widen their scope to include the application of ICT in peripheral areas, and as a result dilute their resources and no longer focus on their original crucial targets. The use of ICT in the commercial sector in general is irregular. Some financial institutions have invested heavily in ICT, and as a result are country leaders in the use of technology.

Other sectors are far behind and their use of ICT is spotty at best. Even those companies that have invested in ICT often do so in restricted ways that are poorly integrated into their businesses. The same is true of the use of the Internet. In part of this is related to the small percentage of Sri Lankan’s with access to the Internet, but the prime reason is, no doubt, the low level of managerial knowledge about the ICT capabilities in their business area.
At all levels of aggregation, statistics about any aspect of ICT in Sri Lanka are highly misleading and can be deceptive when used for policy purposes. Virtually all ICT activity is centered in Colombo, with small pockets in the Galle and Kandy (100 KM away from Colombo city) areas. There is clearly a desire to spread ICT development over a wider geographic area than just Colombo, but it appears that it is not going to be an easy task.

The regions outside of the urban areas are particularly poorly served with respect to electricity and telecommunications. Moreover, the rural areas do not provide the level of comforts and conveniences often (but not always) expected by people with the high-end technical and managerial skills needed to drive this sector. Lastly, the supply of lower level technical skills is substantially lower in these regions. The shortage of knowledgeable teachers and trainers willing to work in rural areas compounds and propagates the problem. The regions currently under LTTE control or in dispute are a special case. They are subject to the above problems, but there are also opportunities should the peace process be successful. The areas will need massive rebuilding of infrastructure. If this rebuilding is done intelligently, the new 21st century infrastructure will be a model to which other areas. The tele center movement is in its infancy in Sri Lanka. Tele centers are community-based points of access to telecom and digital services. In many countries, tele centers have provided the focal point for introducing technology into rural areas, and in fact to disadvantaged groups in urban settings. The concept shows up in many reports and plans, but despite this, there are very few active tele centers. Of more concern is that the groups that are developing tele centre plans are doing this in isolation from each other, and from the worldwide community that has a rich body of knowledge on what works and what does not.

Sri Lanka is a country that depends on the support of developed countries and international agencies. Although this support is greatly appreciated, at times the donor agencies invest in ways that are, at best, uncoordinated, and a poor use of scarce foreign funding and scarce domestic human and organizational resources. The support needs to be better integrated within national planning and priority setting exercises.

Sri Lanka tends to look exclusively towards countries such as India and Singapore for its models and alliances. Cooperative opportunities from other areas, and particularly those related to the British Commonwealth or the United Nations seem to be particularly ignored, despite their potentially beneficial nature.

Underlying most issues in Sri Lanka is the 19-year civil unrest and conflict between the Government of Sri Lanka and the Liberation Tigers of Tamil Eelam (LTTE), which has controlled various territories in the northern and eastern parts of the island and been the source of various disruptions in the south. Although the impact is far wider than just ICT, there is no doubt that ICT development has suffered greatly. When it comes to socio-economic development and the uses of technology Sri Lanka is a country of achievements and contrasts.

It has achieved levels of life expectancy, education and health on a par with countries having twice Sri Lanka’s real Gross Domestic Product (GDP) per capita. It has maintained and improved that performance while having to deal with domestic political problems which saw a major increase in military expenditures during the 1990s and an over five-fold increase in persons in the military between 1985 and 1995. With the current promise of peace in the northeast there is potential for a substantial peace dividend. to be devoted to socio-economic
development, as well as renewed interest by overseas development assistance agencies.

Sri Lanka remains a mainly rural country while facing increasing urbanization with an expected one-third of its population residing in urban areas by the year 2015. Nowhere are the achievements, contrasts and challenges more apparent than in the deployment of technology across the regions of Sri Lanka and the sectors of the Sri Lanka’s economy. The country has achieved a United Nations Development Program Human Development Index that is impressive relative to its GDP per capita. Its health care system includes the latest technologies, open-heart surgery, CT and MRI scans (although access to some of these in public hospitals is limited), while at the same time relying on patient record systems from the 1800s, or no patient records at all. The southwest, and the Colombo area in particular, have fiber-optic networks running along roads where carts are pulled by bullocks. Universities teach advanced computer science programs, but the entire administration of the university, including these students. Academic records are based on paper and manual operations. Bank employees, who earn perhaps US$60 per month (equal to the per capita income of the poorest of developing countries), work for financial institutions that also provide Internet banking.

The government of Sri Lanka began to focus on ICT issues in the mid-1980s. However, today, in 2002, it is still trying to adjust several crucial policies to allow the unimpeded development of ICT in the public and private sectors. Overall, Sri Lanka has maintained impressive progress in terms of its human and socio-economic development given its resource constraints and the unfortunate challenges of civil unrest, the associated diversion of government resources for military purposes, and the resulting human and economic dislocations. Likewise, Sri Lanka has a marvelous potential for using ICT to help the country with its overall development, and help it to thrive in all respects. In many cases, the bits and pieces of the foundations have been laid, and substantial chunks of the necessary technical and institutional infrastructure already in place.

There are several crucial areas that must be addressed. On many fronts the ICT picture that emerges for Sri Lanka is that of a patchwork quilt, or a crossword puzzle, with many of the squares blank and unconnected. Significant and state-of-the-art bits and pieces of the technology are in place. Bits and pieces of the necessary organizational structures in the public, private, academic, government and nongovernmental sectors are in place. Bits and pieces of policy and regulatory process are in place. What appears lacking is how these pieces are knitted together through collaboration and the application of appropriate overall policies, political will, and market signals. To do this will take significant political determination on the part of the central government and a significant. This cannot be achieved solely by the marketing of. Good ideas. Nor can it be imposed by fiat from above by the central government. Domestic stakeholder buy-in is, of course, the outcome of a domestic process of consultation and consensus building. There also appears to be a risk of excess reliance on the belief that ICT development in Sri Lanka can be driven by external forces, be they software export markets, the export of ICT services (call centers, etc.), or the import of foreign capital. In the following sections this survey will focus on those particular aspects of the ICT environment that present both challenges and opportunities for ICT development in Sri Lanka.

Education has been a priority in Sri Lanka since ancient times, and still continues to be today, resulting in one of the highest literacy rates in the area. However, for ICT Development and growth, general literacy is
not sufficient. An adequate supply of skilled ICT professionals, as well as workers and citizens trained in computer uses, and a population literate in the use and uses of computers and telecommunications are clearly required in Sri Lanka. They are required both for Sri Lanka’s success in the development and application of an ICT sector, and for enlisting ICT in Sri Lanka’s overall development. At the moment, adequate supplies of all three forms of ICT-literate human resources are problematic. There are serious supply constraints in the provision of skilled ICT professionals. The level of worker and citizen training in computer use is low. General ICT literacy is low, particularly in the rural sector. It is notably low or spotty in many areas of government, a sector that in many countries leads the others in the use of ICT. The following section will discuss the education sector itself, and the following sections will address its products trained people.

8. Education Sector

The educational sector has multiple and special roles to play in assisting ICT in the development of the nation. Consider the post-secondary (university) sector. It is a producer of ICT inputs in the forms of skills ICT workers and, where successful, a producer of new inventions and ideas. It is a major source of skilled labour, and leadership material, for the other sectors in the economy. It thus has a duty to equip those graduates with the tools and knowledge to use ICTs in their daily work. It also has a duty to help both students and the community understand the social, economic and organizational issues surrounding ICT policy and deployment at all levels in society. It is (or should be) a consumer of ICTs in the execution of its duties as an educational sector. In developed countries, along with the health sector, and social services (pensions, welfare, etc.) it has a major demand for information management systems (MIS) to track product. In reality, in Sri Lanka, the entire operation of most universities (with the possible exception of payroll) is performed manually. The Norwegian Agency for Development Cooperation (NORAD) is currently working with several universities to install automated student record systems.

Beyond its MIS demands education is expected to experience major benefits from the use of ICT for Technology-Enhanced-Learning (TEL). TEL includes everything from electronic/digital support for distance education, to technology-enhanced classrooms, and virtual laboratories. Networked access is also seen as an efficient response to binding constraints in terms of trained instructors and classroom facilities. For example, at the moment instructors from Colombo have to journey to Ruhuna (100KM away from Capital) to teach courses that could be taught at considerable savings in time and travel costs by using a digital video link between Colombo and Ruhuna. Moreover, with such a link, instructors that cannot be convinced to make the trip could still teach at Ruhuna2. The word expected. is in italics in the previous paragraph, because all too often, these expectations are not met. Where this has been attempted elsewhere without some degree of planning and forethought the costs have been high and the benefits low. There is a considerable body of lessons learned and evidence about what works and what doesn’t. Despite the evidence, ICT educational initiatives are frequently rushed forward because of supplier pressure (companies or donor agencies eager to close the deal or start the project). They are frequently started without planning because of internal competition for IT resources (groups will take what they can get with little concern for an implementation strategy, or the costs associated with the one time grant of equipment).
The necessary planning processes here are neither difficult nor unique to the sector. There needs to be a planning process that identifies priorities through stakeholder participation, since the stakeholders will have to execute the plan. There has to be, as always, senior level buy-in, best in the form of identified champions responsible for keeping the process moving. There needs to be a wise blend of central policy and local autonomy so that implementation can respond to local conditions. None of this has happened elsewhere without some degree of coordinated planning. Specific care has to be taken when the process includes resources provided by external donors. That creates the risk of rushed and poorly thought out project formation as stakeholders compete for funding within the education profession, and as we confirmed, among stakeholders in Sri Lanka, there is general agreement that ICTs have a role to play in primary and secondary education. There is less agreement as to how to implement strategy to achieve the objectives of computers in education at these levels. Given the current state of education in Sri Lanka, and the budget constraints facing any deployment of computers in the classroom, careful thought has to be given for where to start and what to do first.

There is considerable scope for learning from others on this front. The education world is littered with successes and failures, large and small. There is evidence that the existing efforts are taking place in near isolation. One lesson learned, and relearned all too often, is that simply placing computers in classrooms is a recipe for failure. Another lesson learned, and not imitated widely enough, is that using computers to train and upgrade teachers can have a high payoff. It not only increases the supply and quality of teachers, it produces teachers able to introduce computers into the curriculum in ways that work.

This is an area where the Ministry responsible for primary and secondary education can take the lead, not only in setting policy and implementation, but also in drawing together that consortium of stakeholders whose wisdom and support will be necessary to make things work. Formulating where to start this process should be one result of a Ministry participation in a national ICT planning process. Recent reports indicate that the Ministry of Education will be seriously addressing the issue of technology in schools. One hopes that this will be done both with due haste and with due caution.

9. Skilled ICT Professionals

The lack of sufficient, trained ICT professional has been a recurring focus in ICT studies and reports in Sri Lanka. There seems to be four main drivers for this shortage:

1. Sri Lanka produces only a small number of ICT-trained University graduates (albeit high quality) each year. The number of positions in the state-funded universities is severely limited. This is part of a bigger problem. Sri Lanka has a good record for primary and secondary education but admits to university only about 6% of successful secondary school leaves (12,000 out of 200,000).

2. Sri Lanka loses many ICT graduates soon after graduating. Their ICT skills demand far higher salaries abroad. As well, the ongoing civil unrest has been a contributing factor. Sri Lanka has a number of state-supported, commercial and quasi-private technical training institutes. However, the quality of training is highly variable.

3. Sri Lanka faces a serious shortage of experienced ICT professionals. Senior people with 6-10 years experience are lacking in software design, project management, and network design and management. This shortage is felt both in
industry and as a shortage of qualified teachers of higher level ICT curriculum.

The problem of insufficient ICT graduates has several dimensions, some of which are being addressed on multiple fronts:

1. All 13 state-funded universities provide some measure of ICT education. However, in the majority of them, it is just some computer science or information management courses within a general BSc degree. Humanities students may not even benefit from this level of training.

2. Several fee-levying institutes (arms of foreign universities) offer Computer Science programs, but the prices tend to be above what most of the population can afford.

3. State-funded university ICT training is being increased, a recent example being the new Faculty of Information Technology at the University of Moratuwa. However, this effort is tightly constrained by the limited supply of senior instructors.

4. The University of Colombo has recently begun an innovative 3-year program called the External Degree of Bachelor of Information Technology, called BIT for short. Under this program, the university sets the curriculum and the exams. Student can prepare for examinations through self-study, or they can go to one of about 40 fee-for-service institutes that provide training and/or tutoring. To promote the quality of such sources of training, the university will publish on its web site, student success rates by institution attended. The BIT program is designed to allow students to stop with a Certificate of Information Technology after year 1, an Advanced Certificate of Information Technology after year 2, or a full Degree Certificate after completion of year 3 and other degree requirements. This strategy produces three levels of ICT skills. Some students can take gainful 3, as with many things, the exact number is the subject of debate, perhaps revolving around the definition of exactly what we are counting.

A Sri Lanka Board of Investment document states that there were 675 IT-skilled B.Sc. graduates in 1999 (including B.Sc. Physical Science). An ICT Cluster strategy document cites a recent JICA study estimating that annually there were 200 graduates in computer science, electronics and engineering. While these numbers vary considerably, even the larger number is small in terms of Sri Lanka’s ICT needs.

Employment after 1 year or 2 years of study. Others can work while completing their degree.

The Sri Lanka Institute of Information Technology (SLIIT) was recently created under the auspices of the government of Sri Lanka as a joint venture Ministries of Education and Higher Education, Internal and International Commerce and Food and Finance and Planning. It comes under the Ministry of Technology and its operation is funded primarily from student fees. As it only started operations less than two years ago, it is premature to gauge its potential impact. Many of its instructors come from existing universities and one can assume its curriculum will be appropriate to meet industry needs.

A core problem in expanding the number of graduates is the extreme shortage of qualified university-level instructors, particularly at the more senior levels. This is caused by the overall shortage of skilled professionals, coupled with the low salaries paid to university staff. Some schools have found clever ways to augment salaries, but this is a stopgap measure at best. In the Colombo area where there are several schools, there is the additional threat of poaching between schools as well as the more traditional loss to industry.
10. Professionals Leaving the Country

Discussions with Sri Lankan software companies and educational institutions indicate that a typical salary for an ICT university-graduate is approximately US$200-300/month. In private industry this may typically rise to as high as US$1,000/month after several years, depending on individual skills and business conditions. These salaries do not compete with overseas salaries if the person has an interest in leaving Sri Lanka. While there are non-pecuniary attractions for individuals to remain in Sri Lanka (family, life style), the salary differential is a factor that cannot easily be changed. Some leading software firms pay as high as $1,750/month for their best staff. At that level, retention rates rise significantly. The promise of an end to the civil conflict is another positive factor currently at play.

There are some attempts to repatriate overseas Sri Lankan ICT professionals back to Sri Lanka. This has been more successful in recent times with the end of the overheated overseas market for ICT skills during the so-called dotcom boom. This is probably only a lull in foreign demand since the history of technology always sees a slow but steady post-bust increase in demand ultimately exceeding the levels achieved prior to the bust. Two skills retention strategies that seem to be underdeveloped in Sri Lanka are the virtual repatriation of the skills of expatriates, and the retention of ICT professionals by linking them on-line to education, research and work abroad. Some Latin-American countries, for example, resort to the Internet to repatriate the skills of overseas nationals, for use in education, research and development, industry, and for civil society activities. Such efforts are low cost and in many cases the expatriates themselves organize them. Other countries, Ghana for example, have used the Internet to retain local skills, for example by linking local medical researchers to overseas research networks.

11. Quality of Technical Institutes

The combination of ICT skills demand and limited access to post-secondary education in Sri Lanka has fuelled the growth of a large number of ICT-related technical training facilities in Sri Lanka. This rapid and unregulated growth has Virtual repatriation means to use the skills of expatriates, even though they are still living outside of Sri Lanka. Often this means subcontracting work to them, or using them to market products or services on behalf of Sri Lankan companies. There are a few companies that are starting to do this now, but in general it is an untapped resource. There are stories of parents investing their life savings to pay for training for a child, only to find out that the graduate had not received sufficient training to make them employable. The twin problems of how to increase both the supply and the quality of training, across a number of skills areas and skills levels, are problems that should be addressed in collaboration across the relevant stakeholders, including the training institutes. Sri Lanka is not in a position to simply institute various levels of formal certification of ICT training facilities. There can be schemes such as the University of Colombo external BIT plan that certify skills. As well, publishing student performance by training institute will allow students, and their families, to identify quality, and influence training quality. Publishing statistics on how many graduates obtain employment utilizing their new skills will also provide a measure of success, but one must be careful that these statistics are honestly presented. There are discussions going on at a number of levels to institute formal certification of ICT professionals. Certification not only labels the prospective employee, but the type of certification will
provide guidance to employers who do not themselves have the skills to identify good employees. The relevant stakeholders, including the training institutes, should consider a mix of guard dog and guide dog strategies to improve ICT skills and the performance of ITC training institutes. The objective is to expand the supply of quality ICT skills, not to restrict supply just to those that currently produce quality ICT skills.

12. High-End Staff Shortage

There remains a serious obstacle to a rapid ramp up of ICT activity in the software sector, and the large-scale application of ICT to organizations. While it is possible to quickly expand the supply of entry-level ICT personnel, it is not possible to immediately produce high-level professionals, especially when that includes 6-10 years of proven experience in software design, project/implementation management, and network management. Some of this demand could be met by the virtual repatriation of the senior skills of expatriate Sri Lankans abroad. Again, an end to the civil unrest will also help, both in the potential for full-time repatriation of ICT skills, and for the short term return work stints of expatriates whose ICT skills are being repatriated on-line the rest of the time. It remains to be seen as to who might organize such efforts. One interesting and successful way to circumvent this problem has been to subcontract high-end tasks to the Computing Services Centre (CSC), a group within the Institute of Computer Technology (ICT) of the University of Colombo. ICT is one of the few really concentrated centers of technological expertise in the country, and the CSC has been involved in many successful projects. These have included feasibility studies, project specification and design, tender evaluation, network design and implementation, as well as overall system development. This group has been involved in some of the most strategic projects involving both government and private enterprise. As a side-benefit, this also serves to give staff members an additional source of income, partially alleviating the low academic salaries. There is a perhaps apocryphal story that some Canadian schools surveyed their students to see how many were employed. 10% said they were employed, 10% said they were not, and 80% did not reply. The schools assumed that the 80% who did not reply were too busy working to reply, and published that 90% of their students found employment. That is, not only provide negative feedback in the case of non-compliance with rules or standards, but to work with the stakeholders to improve quality. However to a large extent, this shortage is one of the real constraints to rapid growth in the Sri Lankan ICT industry and a rapid deployment of ICT to sectors in the Sri Lankan economy.

For the application of ICT across the non-ICT sectors of Sri Lanka (government, health, primary/secondary education, small and medium enterprise (SME), the rural sector) far more people will need to be computer literate and computer trained. There are many user-training programs in place, but as in the case of more technical training, the quality of the training programs is uneven and erratic. The institution of the so-called Computer Driver’s License will be effective in helping to manage and measure the growth in computer literacy, and to give employers a measure of confidence in hiring staff. A strategy of ranking training facilities in terms of testing results, as used by the BIT program, would also help here.


As ICT becomes more a part of everyday life, it will be increasingly necessary for all citizens to have some basic
familiarity with computers. Technology revolutions are complete when such skills are taken for granted and the technology seems to have disappeared into the background. It is easy to say using them in primary and secondary schools will help. It is more difficult to say what this means in actual practice. It can mean using computers to increase the efficiency of administration and management of the schools. It can mean using them to produce more and better teachers. It can mean using them to deliver better curriculum and a better learning experience. It can mean teaching students basic computer skills as the first step toward either Computer Driver’s License proficiency, or as a start toward an ICT career. For any of these to work it is necessary to (a) be clear as to what the actual goals are, (b) have an evidence-supported strategy for getting there, and (c) engage in a planning process in which both stakeholders and champions are brought on side. A recent draft plan produced by the Ministry of Education seems be making aggressive moves in this direction. At this time the aggressive moves should be seen as a declaration of intent and a willingness to champion efforts. It is essential that the other steps take place, steps that wed strategy to resources, or Sri Lanka will run the risk of reproducing the shortcomings of similar efforts elsewhere.

The main shortcoming is the tendency to substitute the provision of technology for a proper implementation strategy. It is better to deploy one half, or one-quarter, the number of computers to successful uses, both for the deliverables and the transferable lessons learned, than it is to engage in a technology intense role-out of more computers and be met by failure. One challenge is helping donor agencies understand the issues here, both with regard to computers in the school and computers in the community. A method that has been successful elsewhere is to only provide technology to a school if there is a local champion and if the school management really wants this project to succeed. A champion could be a staff member at the school, or a local company that will provide help and guidance. The essential characteristic of a champion is that they passionately care that the computers will be used, and will do whatever is necessary to ensure that outcome. When coupled with local management that wants success (and will thus not arbitrarily 10 get in the way), the outcome is invariably good. A success in a school with a local champion tends to spread to nearby schools with a ripple effect. It is also noteworthy that, to date, the technology has not been used in support of other educational goals, specifically those related to English and other language training. It has been found that exposure to the still largely English-dominated computer and Internet world does wonders to increase functional English language skills. And the poor quality of English language education, particularly in rural areas, was highlighted as a major problem by several interviewees. The prognosis for entry-level ICT professional training at the tertiary level is promising, as described in preceding sections. However, there has been too little progress in introducing computers, computer skills and computer-based tools to university students who are not enrolled in technology-related disciplines. It is common for an Arts graduate to never use a computer in his/her studies. This handicaps both the student and the organization where that student will work. The graduate has neither the computer skills nor an overview of how computers fit into the organizational structure and processes surrounding their work. This issue needs to be addressed. For starters, all university students should receive, or have the opportunity to acquire, basic computer literacy training. Some universities are already doing this, but it is not universal. In some cases this involves formal classes or
short-term training programs. In other cases this can be accomplished by giving students email accounts and access to a computer drop in centre. Twenty-five years ago students in industrial countries took formal courses to learn to type. Today they learn their typing literacy as they learn to use email and the Internet. A major impediment to the use of computers in schools at all levels is the lack of teachers with computer skills. This points back to the need for a planning process that clarifies goals, involves stakeholders and identifies champions who will support implementation. The team was told that there is a massive World Bank project to provide computers in primary and secondary schools, and to provide teacher training, but full details were not available at the time.

Sri Lankans have proved themselves eminently educable and this has been duly recognized in global comparisons. So the prognosis for the outcomes of future effort in this area is good. To ensure this, there will have to be a deliberate focus not only on tertiary education, but the use of computers in primary and secondary schools, and on the introduction of computer-training for instructors, at all levels. In recent years the education budget has been compromised by the military demands from the civil unrest. There is the possibility of deploying a peace dividend and renewed foreign donor assistance to an expanded program of ICT supported education and curriculum reform.

Other countries with much lower GDP per capita than Sri Lanka have managed to ramp up their production of ICT professionals and in parallel insured that all university graduates are ICT-literate. Sri Lanka must do the same.

14. Internet Access

There are many ISPs in Sri Lanka, with SLT being the largest. At last count, there were 17 active providers, with an additional 10 licenses issued. Most of these players are quite small. The vast majority of subscribers are in the Colombo area, but there are points-of-presence in several other urban centers. SLT offers access to its ISP service as a local call from anywhere on the island. However, this service is only available to those who use SLT local loops for their voice telephone. As noted in Attachment A, there are cases where the SLT loops cannot sustain a data connection. All ISPs (or their downstream supplier) interconnect at the Sri Lanka Domestic Interchange, so in theory, intra-country traffic will never go offshore. The cost of Internet ISP access is comparable to similar services elsewhere in the world. Many non-SLT providers only offer 28.8/33.6 kbps dial service, and access from many non-SLT local loops is limited to 28.8 (presumably due to the use of compressed 32kb voice services). A typical cost (from SLT) is US$11 per month for 150 hours. The actual per minute cost of dialup Internet access is normally high because of the additional per-minute cost of voice service in Sri Lanka. The base cost of a telephone line is low (about US$3-4 per month). However, the cost per minute, particularly during weekday daylight hours, is abnormally high (for SLT it is US$1.80 per hour after the first 8 hours). 11 Attachment A recounts experiences while attempting to access the Internet from Hotels in Colombo and in other areas. It also provides more details on telephone usage costs from the three providers as well as from several major hotels. The overall conclusion is that the ability to access the Internet is not quite as bulletproof as the suppliers claim. Discussions with both SLT and TRC employees said that moderate to heavy Internet users would have more economical access with a leased line (at about US$200 per month) a solution that is not economical in its own right, nor feasible for the vast majority of Internet users in Sri Lanka.
Most observers believe that the industry must be completely opened up, with a level playing field for all players and a competitive market for ICT services, including VoIP. Both safeguards and new initiatives are needed to ensure that rural areas are well served. Of particular import is competitive market access to undersea external connectivity. With the emergence of wireless competitors, SLT has demonstrated that they can adapt and could successfully compete in a competitive environment. In some ways SLT has followed the market in a sector where strategic leadership involves leading the market. In a more competitive environment, new and enhanced products and services will be offered to lead the market, attracting business that would otherwise bypass Sri Lanka altogether.

15. Use of the Internet

The use of the Internet is just a particular ICT application, but nevertheless a cornerstone application. Moreover, the problems here are symptomatic of the more general ICT issues in Sri Lanka. As mentioned above, various industries in Sri Lanka are making use of e-mail and the web. However, it is notable that virtually none of them have truly integrated it into their business. It was difficult to find examples where the use of either e-mail or the web was a crucial link to business success. More likely, it was ancillary, and not highly viewed. As an example mentioned earlier, some hotels have web sites and even allow booking over the web. But they don’t actually expect people to use it, and set prices online to virtually ensure that it is not used. Web sites are typically very incomplete, and generally lack sufficient information (such as prices) to be used as a practical selling medium. Certainly part of the reluctance of businesses to use the Internet is the relatively small number of Internet users within the country. Even the bank that has instituted Internet banking has done so for the visibility it provides, not because it is a major path for customer activity. This will not likely change without some economic motive, which will not be there until there is far wider use of the Internet in general. That will not happen without lowered price barriers, enhanced rural access and increased ICT literacy.

IT industry alone can not make the desired changes, the government of Sri Lanka and institutions such as the Board of Investment too must play their role. The government needs to put in place the necessary infrastructure, while efforts must also be made to attract foreign investments. The key markets in terms of digital content and premium services growth are the UK, Japan, France and US.

Many managers and many organizations have not made optimum use of IT due to uncertainty about the return on investment. However, many blue chips—especially multinationals—have invested heavily in IT—and as a result, command strategic advantage over competition. This is imperative for companies that utilize IT for service and operational requirements and assign the same for business-intelligence development through stakeholder involvement. The fundamental requirement for successful software exports is the availability of intelligent human resources, followed by technical skills, quality and marketing. However, Sri Lanka has an abundance of human resources, but not necessarily the technical skills and marketing expertise. Sri Lankan companies that have invested in direct software exports have often had little or no success, with few exceptions. International companies which have used Sri Lanka for offshore operations have been successful, largely due to their technical and training expertise. The Indian IT industry is ahead of Sri Lanka today, as there was no encouragement for the local sector during the 70s.
It was looked upon as something that would usurp already scarce jobs. In fact, it was only within the last five years or so that Sri Lankan universities have begun producing graduates in sufficient numbers, who are acceptable to export-oriented companies. One positive programmer is ahead of his or her Indian counterpart. They are far easier to manage, are transparent, communicate better, adapt faster in foreign countries and perform 30 to 50 per cent better than at home.

The local IT industry is now generating jobs in the business process outsourcing arena, and that requires accounting skills in addition to IT knowledge. The growth in the software industry for programmers is quite slow, and many are languishing-with no suitable jobs-having completed their educations.

The overall standard of IT education in Sri Lanka is now up to the mark, and quality students are available in sufficient numbers. If this had been achieved 15 years ago, Sri Lanka software exports could have reached US $500 million by now. The mushrooming of training centers must be allowed to continue, as it will create interest in young minds to appreciate the basic value of IT. However, education and training centers alone are not enough. The key to IT success lies within a combination factor s, which require IT personal with entrepreneurial traits and overseas experience to establish export operations here.

E-Government

The e-government index of Sri Lanka is 0.92 which is below the global mean e-government index of 1.62 and it indicates that present e-government capacity of Sri Lanka is poor. A research on the web survey of government institutes revealed that 30% of ministries in the country do not have web sites or may not be access able since they are inactive. 38% of the ministries are still in the infant stage and information available in web pages is often state in content and the number of pages is limited to few web pages. Only about 17 % of ministries offer interactive web content, where users have access to regularly updated information and can communicate through e-mail and download government documents through the internet. 15 % of the ministries provide some online services to the citizens. In same study a sample e-mail was sent and the time taken to reply was recorded. It was found that 99% of e-mails were not responded to by the web masters. These findings clearly indicate the situation in e-government in Sri Lanka. In the Asia Pacific region, the progress of e-government solutions is very slow and very little information is accessible by the users through the Internet. Most of the countries do not adapt government solutions compatible with the specific needs of the country. Most of resource poor nations try to duplicate the western web based strategy for local solutions. Therefore, it is debatable, whether or not countries like Sri Lanka. Where poor telecommunications facilities are available, and struggling with unbearable telephone bills, should immediately go for web based IT initiatives.


Sri Lanka has a small emerging software development industry concentrating on exports, which ran at about $50 million in year of 2000 with a high percentage on a subcontract basis. The industry faces constrains from a shortage of skilled professionals, lack of venture capital and narrow telecommunication bandwidth.

With some 80 companies, Sri Lanka’s software industry remains in its infancy. Most have come into operation since 1996, when the Board of Investment (BOI), offered special incentives, including tax holidays and duty free imports for software exporters. The industry has not received any other
assistance from the Government. Sri Lanka exported an estimated $50 million in software during 2000. BOI seeks to build a world class IT industry with annual exports of $1 billion by 2008. A major constraint for the rapid development of the industry remains a shortage of skilled professionals. Until now, the education system did not give much thought to increasing the number of IT graduates. As a result, Sri Lanka has not been able to take advantage of its high literacy rate to promote the IT industry. Local IT entrepreneurs, however, remain guardedly optimisitc that Sri Lanka can carve a niche for itself in the high value-added software product development rather than the low value-added IT services which gravitate to India because of its large English-literate population and low wages.

Except for a few foreign joint ventures and subsidiaries, no major internationally recognized software development companies operate in Sri Lanka. A few indigenous companies, however, have made inroads in the software development industry. Most of the industry consists of small firms founded by computer professionals, some returning from the U.S. to start their own companies.

The recent expansion of the software development industry has resulted largely from outsourcing for American, Middle Eastern and European clients in internet-based software development and business applications. Only a handful of companies are engaged in internationally recognized product development. In offshore services sector, local programmers produce software for overseas clients based on their designs and specifications. Some companies providing outsourcing services have dedicated support service centers abroad as well. A few employ several hundred programmers; John Keells Computer Services (JKCS), for example, a subsidiary of Sri Lanka’s leading conglomerate John Keells Holdings (JKH) and one of the leaders in software services in Sri Lanka, employs 500 programmers and hopes to increase this number to 2000 by 2003. Dubai-based Emirates Airline has outsourced their entire software design services to JKCS. P&O Nedlloydys of UK and NTT of Japan are other key clients of JKCS. Another major player in software outsourcing is eRunway. eRunway, headquartered in the US, has an internet software development center in Colombo employing over 300 software engineers. The company has several Fortune 1000 companies among its clientele.

Millennium Information Technologies (MIT), founded by a local computer professional, is the most successful company in product development. Valued at over $100 million, MIT hopes to list on NASDAQ. MIT has built an international reputation for capital market and telecommunication industry software. Its state of the art stock exchange suites are used in stock exchanges in Malaysia (MESDAQ), Croatia, Mauritius and Sri Lanka (CSE). Thanks to MIT, the Colombo Stock Exchange (CSE) is one of the world's most technologically advanced stock exchanges. MIT is also among two short-listed bidders for a tender to supply a stock exchange suite to the Boston Stock Exchange. MIT works in partnership with Oracle, Sun Microsystems, iPlanet and CISCO. Others have also successfully ventured into product development, on a smaller scale, by identifying market niches in the U.S. and Europe. The software development industry has paved the way for a number of joint ventures between companies in Sri Lanka and the United States for software development.

Global Software Labs (GSL), a US-Sri Lanka join venture, was recently selected by Microsoft to make software for the company. GSL’s success with Microsoft is considered a major breakthrough for Sri Lanka’s fledgling software companies. Mobinetrix, a subsidiary of Silicon Valley based Crossvue Inc (formerly Receiptcity.com), produces web-based software in Sri Lanka for
securing, storing and retrieving electronic receipts for the parent company. eRunway, headquartered in Boston MA, has opened a fully owned offshore software development company in Sri Lanka. TSG software, another US-Sri Lanka joint venture, recently signed a MOU with a Swedish company for outsourcing software development in Sri Lanka.

US-based venture capital companies, such as Citicorp International Finance Corporation, GMO Trust, Sigma Investments and Buchanan Investments, have invested in software development companies in Sri Lanka. Many local software companies have also opened branch offices in the U.S. in order to be closer to their customers.

Although information technology skills development in itself is creating an industry, there is an acute shortage of software professionals in the country. Unlike India, Sri Lanka does not have a large pool of IT graduates. University education is a state monopoly and access to universities is controlled. The university system still caters mainly to social sciences. Although a few private institutions offer external foreign IT degree programs, their output is limited at present. Sri Lanka produces only about 250 computer science graduates per year. A further 650 offer computer science as one of the core subjects. There are many IT training institutions with foreign collaboration. In addition, the IT training industry is currently witnessing a proliferation in the number of small training institutes. There are doubts regarding the quality of students graduating from most of these smaller institutions.

Demand for qualified computer professionals, especially university graduates, is high and retention is a problem. Leading companies in the field snap up fresh computer science graduates. Their skills are then upgraded through post entry training in latest software development tools. Some firms have adopted various retention strategies such as employee stock option schemes and flexible working hours and offer premium salaries. Currently, a fresh computer science graduate can earn about $400 per month. An experienced software engineer might earn $1000-1500 per month. Some companies have even hired Indian nationals to work on their software projects and training schools.

According to industry sources, Sri Lankan workers are intelligent and highly trainable. University courses, however, are not quite up to date and universities lack expertise in some of the latest software development tools and R&D facilities. There are various programs to increase the number of IT graduates including an IT degree program by a newly established Sri Lanka Institute of Information Technology (SLIIT). The universities are also taking steps to increase their intake of technology students. The Ministry of Education intends to introduce IT education to schools. Sri Lanka’s donor community has also stressed the need for improvements in tertiary education, with a special emphasis on IT, at the recent Sri Lanka Development Forum Meeting in Paris.

Software developers face an acute telecommunication bandwidth problem. The present capacity in Sri Lanka for international telecom traffic is only 12 mega bits per second (MBPS) from fiber optic lines. The software industry has been campaigning in vain for additional bandwidth. Despite various promises by the BOI, a 2MBPS dedicated fiber optic line with a drop point in the U.S. for the software industry has not yet materialized. Sri Lanka Telecom (SLT), which has monopoly access to international fiber optic circuits, is supposedly not interested in improving bandwidth. Further, due to SLT monopoly, there is no room for any other investor to provide access to optical fiber lines. In addition, to bandwidth, Sri Lanka also lacks a vibrant venture capital industry and strong intellectual property right (IPR) laws.
Although a recent amendment to IPR law included software as a protected item, there are no transparent, effective and enforceable mechanisms for intellectual property protection. Trade secrets are also not protected under the current law. Further, the lack of local demand for software developed locally is also inhibiting the product development capabilities of the industry.

Various programs are underway to develop the software development industry in Sri Lanka. The government has recently created a separate Ministry for Information Technology and Higher Education. The government believes that due to the high literacy rate, Sri Lanka can be converted to an information technology savvy nation within 5-10 years. The Ministry is in the process of formulating a national policy and action plan for IT development. Software industry sources are rather skeptical about the effectiveness in any government leadership for the industry. According to them, government officials do not understand business processes and at most could inhibit industry growth. The government’s precarious fiscal position also leaves little room for investment in related infrastructure. Already, bureaucratic barriers have prevented setting up of a regional Java Training Center in Sri Lanka by SunMicro systems. The software industry, according to industry leaders, will continue to develop more on individual company efforts. For instance, some software developers have set up their own training institutes to meet the human resources shortage.

Meanwhile, BOI plans to develop several IT training centers and IT parks with improved telecommunication facilities. A USAID-funded competitiveness initiative project (CIP) also aims to develop the IT industry. It has created an Information and Communication Industry cluster (ICTC) representing software, hardware, electronics, communication and IT training sectors. CIP hopes to provide technical assistance to the ICTC to explore software development options. Further, Sri Lanka Software Exporters Association, which has about 35 members, is engaged in training, improving financing options for the industry, research and development, marketing and improving competitiveness.

**ICT Profile - Sri Lanka**

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<td><strong>Total population</strong></td>
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<td><strong>Rural population as a percentage of total population</strong></td>
<td>70% (2003 estimated)</td>
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<td><strong>Key economic sectors (with percentages of GDP)</strong></td>
<td>Agriculture (19.4%), industry (26.5%), services (54.1%)</td>
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<td><strong>Literacy in the national language(s)</strong></td>
<td>90.4% (2003)</td>
</tr>
<tr>
<td><strong>Literacy in English</strong></td>
<td>Not officially measured, but believed to be around 3-5%</td>
</tr>
<tr>
<td><strong>Computer ownership per 100 inhabitants</strong></td>
<td>0.89 (2004)</td>
</tr>
<tr>
<td><strong>Telephone lines per 100 inhabitants</strong></td>
<td>9.0 (fixed and mobile combined) (2004)</td>
</tr>
<tr>
<td><strong>Internet hosts per 10,000 inhabitants</strong></td>
<td>1.27 (2004)</td>
</tr>
</tbody>
</table>
### Internet cafés/telecentres per 10,000 inhabitants
No data available on telecentres, but Internet cafés estimated to be around 0.1 per 10,000

### Internet users per 100 inhabitants
0.787 (2004)

### Cell phone subscribers per 100 inhabitants
3.9 (2004)

### Number of websites in the national language
Estimated to be around 500 for both Sinhala and Tamil

### Number of websites in English and other language(s)
25,000 (estimated)

<table>
<thead>
<tr>
<th>ICT Developments</th>
<th>ICT Policy</th>
</tr>
</thead>
</table>
| • Teledensity — 8.0%  
• Three fixed-line operators  
• Four mobile phone operators  
• 32 ISPs  
• Telephone services to 595 rural sub-post offices underway | • Ministry of Economic Reforms, Science and Technology  
• National Computer Policy, 1983  
• ICT Roadmap through eSL Initiative  
• Objectives of eSL policy, 2003  
  o Implementation  
  o Infrastructure & environment  
  o Human resource  
  o e-Government  
  o ICT for development |

<table>
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<tr>
<th>Issues</th>
<th>Regulatory Frameworks</th>
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</table>
| • Liberalized international voice telephone  
• Telecom regulatory commission to promote fair competition  
• Intellectual Property Act No 36 supersedes No 53 of 1979 and conforms to WTO and TRIPS. | • Telecom Regulatory Commission  
• ICT Act (No 27), 2003 establishes ICT Agency of Sri Lanka (ICTA — 2003)  
• Science and Technology Act is parent regulatory instrument under ICTA functions  
• Evidence Act No 14, 1995  
• Computer Crimes Bill  
• Code of IPR, Act No 52, 1979, amended 1997 |

17. Conclusion

Sri Lanka's weaknesses in information technology can be summarized as the following:

1. Telecommunication infrastructure will have to improve
2. Political problems could discourage foreign investment
3. Opposition to privatization by trade unions
4. Lack of sophisticated software

Currently Sri Lanka greatest weakness is the poor telecommunication infrastructure. Complete lack of telephone connections to some areas of the country is evidence of this. While Internet connections and email...
software is now readily available, the pricing puts them beyond the reach of a greater majority of the population.

Sri Lanka's eleven year ethnic rife with the LTTE terrorist infraction still continues to hinder the country's social, economic and political development. I strongly believe that until a solution is reached to solve the conflict Sri Lanka's journey forward on the path to high-tech success will be a slow and expensive venture.

It will be many years before Sri Lanka will probably be able to vision Bill Gates PC in every home, around the nation. The government has made many of the necessary steps, both with legal policy to open doors to telecommunication and with fiscal backing. It promises 160,000 phone lines to the rural areas in the 2005-06 years. On the down side, Sri Lanka still has a very weak telecommunication infrastructure, certainly not attractive to firms using high-tech communications to stay in touch. This issue, coupled together with the violent political rives is still keeping business at bay from this otherwise highly lucrative emerging market. Culturally, corruption (bribes, price fixing, etc.) still occur, but government is taking major actions towards curbing this situation.

Since the early 1990's, the government has placed a great deal of emphasis of developing the Telecommunications Infrastructure. Policies such as lax import duties on cellular phones --which used to be at 87% of cost-- to help build the business communities, encouragement of foreign direct investments with attractive trading regulations and pledging of public funds to build the telecom infrastructure will all help the globally competing domestic firms.

However, despite these strong resolutions, the cost of setting up a simple LAN network with limited IT specialists (who are still few in numbers) continues to be an expensive venture. Analysts estimate the cost of a three party network, for example to run anywhere between $20,000 to $50,000. The cost of training staff in computers is also a high price activity with 3-4 week training sessions costing thousands of rupees.

The vision for Sri Lanka for the next five years in regards to telecommunications can be summarized as follows:

(i) Increased telephone connections and telephone usage in the rural areas of Sri Lanka.

(ii) Heavy investment by foreign companies in building the telecommunications infrastructure so that they get a piece of the pie when Sri Lanka reaches NIC status.

(iii) More widespread usage of e-mail and Internet activity in Universities around the nation. Stronger government policies regarding intellectual property rights.

(iv) At least a five fold increase in PC usage.

(v) Currently, several foreign and domestic firms have united in joint-ventures to lay cables around the country. I foresee basic cable television hitting the market very soon too.

References


Department of Census and Statistics. Government Publications,


annual2001/slt_full_report.pdf

