

MARCH 2003 • SHAWN MENDES, ALBERT TUIJNMAN, NINA YOUNG

Education and training for ICT
development in Sri Lanka and Tanzania

Training for ICT deve- lopment in Sri Lanka and Tanzania

Table of Contents

Preface	3
I. Executive Summary	4
Organization of the report	4
Sida and ICT	5
Creating a model for ICT development in Sida partner countries	5
Methodology	7
Overview of ICT	8
Overall impressions	9
Recommendations	11
Recommendations – Sri Lanka	12
Recommendations – Tanzania	13
II. Education and ICT training in Sweden	17
Sweden’s ICT Landscape	17
Sweden – a learning-centred society	20
Education in Sweden	22
Sweden’s active education policy	26
Kunskapslyftet — the Adult Education Initiative	29
KY — Advanced Vocational Training	36
SwIT (Sweden Information Technology Vocational Training)	38
Summary	42
III. Sri Lanka	44
Introduction	44
Sri Lanka in Perspective: Government	45
Economic overview	46
Sida development cooperation in Sri Lanka	49
Labour market overview	50
Poverty in Sri Lanka	53
Skills profiles of the adult population	53
The education system in Sri Lanka	57
Vocational and technical training	64
Supply-side analysis and policy recommendations	66
Conclusions	70
IV. Tanzania	72
History	72
Country overview	73
Economic overview	73
Sida development cooperation in Tanzania	76
Tanzania’s national visions	77
ICT in Tanzania	82
Education in Tanzania	90
Education for self-reliance	90
Recommendations	98

Bibliography and interviews	104
Interviews	110
Appendix 1: Abbreviations	115

Published by Sida 2003

Department for Infrastructure and Economic Cooperation

Author: Shawn Mendes, Albert Tuijnman, Nina Young, Institute of International Education, Stockholm University

Printed by Elanders Novum AB, 2003

Art no: SIDA2264en

Preface

This project was based at the Institute of International Education at Stockholm University in the latter half 2002. The field research for the project research was conducted in Sri Lanka in August and in Tanzania in late August and early September.

Approximate exchange rates at the time of were as follows.

- Sweden: USD 1 = SEK 9.2.
- Tanzania: USD 1 = 1000 Tsh; SEK 1 = Tsh 105.
- Sri Lanka: USD 1 = LKR 97; SEK 1 = LKR 11.

The report is written in Canadian English.

We would like to thank the many people who took time to share their insights and knowledge with us. In particular we would like express our gratitude to the following people, grouped by country.

Sweden

We thank Sida staff members Per-Einar Tröften and Tomas Kjellqvist for their guidance and feedback throughout the project. We also appreciate the time people from our interview list made to speak with us.

Sri Lanka

First and foremost, we thank Professor V.K. Samaranayake. We would also like to thank the many people from our interview list that provided us with information and insights on Sri Lanka.

Tanzania

Thanks go to Sida staff members Nils Jensen and Ralf Kårhammer at the Swedish Embassy in Dar es Salaam. We also thank the ambassador, Sten Rylander, for his broad insights. Special thanks also go to ICT dynamo Simbo Ntiro for making many connections with industry, government and NGO players in Tanzania's ICT landscape. Richard Masika of the Dar es Salaam Institute of Technology also deserves recognition for his willingness to help. Many others deserve our gratitude, most of whom appear on the attached interview list.

I. Executive Summary

The Institute of International Education at Stockholm University accepted a commission to study the development of ICT education in Sweden with the aim to create a model for development in Sida (Swedish International Development Cooperation Agency) partner countries. The link between Sweden and ICT is a logical one given the country's strong and dynamic information and communication technology sector.

Training institutions in most countries have failed to produce the numbers of ICT technicians and professionals needed to fill the labour market demand of the ICT sector. This skills bottleneck will hamper ICT development in many developing countries. And the solution is an increase in the quantity and quality of ICT training in countries such as Sri Lanka and Tanzania.

ICT can help developing economies participate in the global economy. The resulting improvement in communications and the increased exchange of information will positively impact Sida partner countries. Although the "burst of the IT bubble" in many industrialized countries may lead some to question the promotion of ICT in development cooperation, there remains strong interest in this sector especially in developing countries where ICT infrastructure and usage are not widespread. Moreover, developing countries are many years from the excessive ICT build-up that slowed growth in advanced capitalist countries. Indeed, the ICT sector is just now gaining momentum in many developing countries but growth has been hampered by inadequate infrastructure and shortages of skilled workers.

Organization of the report

The study begins by exploring the terms IT and ICT, because it is important to understand this new and dynamic sector. This is followed by a human resources approach to ICT, based on the assumption that a program for ICT education should be structured according to a desired level of ICT proficiency. Swedish government policies that have created the conditions for Sweden's competency in the ICT sector are also reviewed. Highlights include the cooperation between the public and private sector, and between social partners such as business and labour, which remains characteristic of Sweden, even in the 21st century. This is followed by a thorough analysis of education and training in Sweden,

with a focus on the experience of Kunskapslyftet, KY and SwIT. The history, goals, financing and outcomes of these programs are reviewed, with an emphasis on ICT training. The sections on Sri Lanka and Tanzania follow a similar logic though they are more geared to concrete policy recommendations appearing at the end of those chapters.

Sida and ICT

Sida has been focusing on ICT development since 1999 when the agency defined the sector as a strategically important area for development cooperation. The agency's promotion of ICT in development is built around the following strategy:

- Integration of ICT as an important part of all its cooperation programs;
- Ensuring promotion of ICT in development cooperation benefits the poor; and
- Developing ICT as a strategic area for Swedish development cooperation.

Therefore, developing a model for education and training to build ICT competency in Sida partner countries is an important part of Sweden's contribution to the overall initiative to stimulate economic growth and social development in developing countries.

A critical component of this research will be to 1) identify specific skills shortages that serve as bottlenecks to ICT growth in Sri Lanka and Tanzania; and 2) identify lessons that can be applied from the Swedish experience to facilitate opportunities for developing countries to contribute to the global ICT economy.

Sida has a long history of development cooperation with Sri Lanka and Tanzania. At the outset, it is recognized that the enormous gulf in available resources between Sweden and Sri Lanka and, especially, Tanzania make exporting policy lessons a precarious/difficult task. However, the Swedish experience with the ICT sector, and more importantly, training workers through flexible means to participate in this segment of the new economy is unique. Moreover, it is believed that there are elements of this model that will be relevant for, and applicable to, Sida partner countries. Therefore, even if the Swedish ICT education and training system per se are not exportable, the governance model and other lessons will be. In developing recommendations, stakeholder commitment in donor countries is critical and will play an important role in the development of a model for education and training for ICT development in Sri Lanka and Tanzania.

Creating a model for ICT development in Sida partner countries

To achieve the end goal of building a model that guides development of ICT education and training in Sri Lanka and Tanzania, research was undertaken in two parts. First, an analysis of how Sweden raised the ICT knowledge of its labour force, focusing on the roles played by the public and private sectors, was conducted. Indeed, Sweden has long been one of the leading countries in the world in investing in its ICT human resources and infrastructure and this has facilitated the country's rela-

tively rapid movement from an industrial- to a knowledge-based society. The rich human resources of Sweden allowed many ICT companies to emerge and/or expand in the 1990s and this contributed to the superior ICT infrastructure in the country (Odero, 2002). Most important for this study, Sweden has many programs to develop ICT skills and facilitate ICT sector growth by clearing supply bottlenecks in the labour market.

Sweden's telecommunication and ICT policies have had a positive influence on the competency of the population and the country ranks high in international comparisons of ICT because of favourable government policies and other conditions. The country also has a tradition of investing in human and social capital and it is within this environment that programs such as *Kunskapslyftet* (the Adult Education Initiative), *Kvalificerad Yrkesutbildning* (KY – Advanced Vocational Education) and *SwIT* (Sweden Information Technology vocational training program) emerged. Therefore, Swedish policies deserve attention.

The importance of contributing factors such as *Kunskapslyftet*, KY, SwIT, workforce training by companies, and innovative partnerships between the public and private sector are reviewed. And elements unique to the Swedish experience such as high levels of literacy, newspaper readership, education spending and educational attainment, positive cultural perception of education, and the role of social partners were evaluated for their general applicability for building a model. After identifying a Swedish model of education and training for ICT professionals and technicians, the work then shifted to Sri Lanka and Tanzania.

The second part of the research is based on the analytical framework developed from the Swedish experience and consisted of surveys of ICT training and education initiatives in Sri Lanka and Tanzania. Project consultants met with relevant persons with government, education and training, and industry to determine education and training needs, and delivery possibilities, for ICT development in the two countries. Issues such as deregulation and/or privatization of telecom monopolies, existence of networks between government and the private sector, government ability to finance education initiatives, and municipal support to develop MCTs (multipurpose community telecentres) were considered.

A sector-based approach to development

At the broadest level, Sweden's development cooperation is driven by a commitment to "basic education for all." Sida is guided by six objectives stipulated by the Swedish Parliament: 1) economic growth; 2) economic and social equality; 3) economic and political independence; 4) democratic development; 5) sustainable use of natural resources; and 6) equal rights for men and women (Lind and McNab, 2000:424).

In 1999, Sida formulated its policy for ICT in development cooperation and concluded that the agency should integrate ICT as a natural and important part of its programs. One of the major goals is to improve communications and the exchange of information but Sida also wants to ensure that development cooperation integrating ICT is promoted for the benefit of the poor. This thinking is in line with the aims of *Kunskapslyftet*, which is to address inequalities of opportunity and support a more equitable distribution of wealth and educational competency.

Sida commissioned this study on how the experience of Kunskapslyftet can be applied to the implementation of education initiatives that raise the level of knowledge of ICT in developing countries. The aim of the first section of this report is to provide an overview of the Kunskapslyftet, and other Swedish initiatives, and highlight elements that may prove instructive in supporting ICT training in Sida partner countries. Subsequent sections of the report survey ICT education and training in Sri Lanka and Tanzania. The end result is a model for ICT training that provides a framework of discussion for Sida to consider specific interventions to facilitate ICT training in developing countries. It may also serve as a Swedish contribution to the United Nations ICT Taskforce.

Methodology

Staff at the Institute of International Education (IIE) at Stockholm University directed the research. The IIE is one of the few institutes in the Nordic countries specialising in international and comparative education. After more than thirty years in this field, the institute is well known for its contribution to research and training. The IIE is an 'international' institute that has successfully created a multi-cultural and multi-disciplinary research and teaching environment, which attracts a number of visiting scholars and lecturers as well as students from many parts of the world.

The methods used to conduct the initial study on the Swedish experience with ICT education and training started with a review of existing literature. Interviews were conducted with officials from the Ministries of Education and Science; Industry, Employment and Communications; and Finance. Interviews were also conducted with staff from the National Agency of Education (Skolverket); the National Agency for Higher Education; the Agency for Advanced Vocational Education (Kvalificerad Yrkesutbildning); and others. Contact was also established with researchers at Stockholm University; Umeå University; and the Institute for Labour Market Policy Evaluation. Publications and reports written by Skolverket and the Ministry of Industry were referred to, as well as studies conducted by academics and several other sources including reports by international agencies and consultants. The end result of the above process highlights the best practices of Swedish education initiatives in the ICT sector.

Prior to commencing the field studies on Sri Lanka and Tanzania, web-based research, literature reviews and interviews with experts in the field were conducted to collect background knowledge. Previous studies on both ICT and education and training in Sri Lanka and Tanzania were reviewed. Contacts and appointments with key persons in both countries were made and mission plans were prepared. Roughly 20 interviews were conducted with those responsible for ICT training initiatives in each country.

In Sri Lanka, ministry officials organized visits to both private and public ICT training facilities. Key industry representatives provided advice and recommendations of whom to meet. Contacts were also established with academic institutions and government officials. Interviews with Sida consultants, including one working on an ICT project

concerning government policy toward ICT in Sri Lanka, were also conducted. Prior studies on the ICT sector in Sri Lanka were analyzed and used to identify further areas of study.

In Tanzania a similar process was initiated with contacts established with Sida staff, government officials and representatives of education and training institutions. Industry contacts were also established in both Dar es Salaam and in Arusha. Many of the interviews in Tanzania were with various public and private training institutions as well as education and training funding and regulatory bodies. Contacts were also made with key government, private sector actors and NGOs in Tanzania's ICT landscape. Finally, contact was established with international agencies such as the UNDP and World Bank. Interview lists for Sweden, Sri Lanka and Tanzania are provided in the bibliography.

Overview of ICT

For clarity's sake, it is useful to define IT and ICT. IT includes hardware, such as computers and components to build the technological infrastructure, and software for everything from games to networks, operating systems and applications. It also includes companies selling goods and services over the internet, offering internet services, broadband connections, satellite hook-ups, wireless communication and phone lines (Harris, 2001). I-C-T captures the communication/information transmission aspect of new company entrants and includes the large telecommunications sector. It is important to note that ICT does not only refer to technology, its main benefit is to achieve efficiency, cost effectiveness and reach more people.

ICT proficiency and course suitability for obtaining proficiency

It is important to distinguish between different levels of ICT proficiency because training programs can be structured according to the level of proficiency desired. The Institute of Management for Information Science (IMIS) describes a wide range of ICT skills ranging from professions requiring university training, to occupations specific to an application or industry, to administrative occupations required to support various projects (IMIS, 2002). The Swedish Ministry of Industry, Employment and Communications (2000a) writes of three broad types of IT proficiency:

1. General proficiency – is the level of proficiency needed among the general public for technology to have its full impact (e.g., searching for information or conducting business on the internet). It also involves proficiency in languages and mathematics. Some courses offered through Kunskapslyftet, such as the ECDL¹, result in general proficiency. General proficiency is critical to implementing ICT across the economy. To spread ICT in developing countries (e.g., government, education, SMEs, rural areas), far more people need to be computer literate and trained (Greenberg, 2002: 9). However, general level proficiency does not directly promote ICT sector growth. This requires a higher level of proficiency.

¹ The European Computer Driving License offers seven modules of instruction: concepts of ICT; using computers; word processing; spreadsheets; databases; presentations; and communications (using the internet and e-mail). Similar programs are offered in Sri Lanka and Tanzania.

2. Specialist Proficiency – is required for those who develop and apply technology. This level typically includes a degree in IT or another field though the skills can be self-taught or acquired in the workplace. IMIS notes that ICT trainees are not “marketable” until they have some work experience, and that the integration of theoretical studies with work-based training enhances employability and utility (IMIS, 2002). *While courses offered through Kunskapslyftet do not provide a work-based element, those offered through KY² and SwIT do.* KY and SwIT programs are also more specialised than those offered through Kunskapslyftet and are better geared to developing the specialist proficiency that facilitates ICT sector growth.

3. Strategic Proficiency – refers to the use of specialist proficiency to ensure optimal efficiency of a company or endeavor. Strategic proficiency implies the ability to plan – important in a dynamic industry such as ICT. Samaranayake argues that IT workers must cope with rapidly changing technology and applications, understand client needs and be creative to remain competitive. University graduates are preferred due to their maturity and ‘education’ rather than ‘skills training’ is valued (Samaranayake, 2002:4). This underscores the importance of programs that focus on the development of creative capacity.

Five levels of ICT skills

For the purposes of this study, we have developed a five level scale of ICT skills, outlined in table 1.1 below. As the focus of the study is on training models that support the acquisition of practical and technical ICT skills, much of the analysis centres on the challenge of increasing the number of individuals with Level 3 and 4 competency in Sri Lanka and Tanzania.

Table 1.1 Five levels of ICT skills

ICT awareness and skills	
Level 1	Little or no awareness of ICT, especially of computers.
Level 2	Aware of ICT and computers but no skills to use them.
Level 3	<i>ICT practical users</i> – computer business applications (e.g., word processing, spreadsheets, e-mail, internet).
Level 4	<i>ICT technicians</i> – design websites, databases, install telecommunications <i>Power users and ‘IT Fundis’</i> – train other staff, advise management on ICT.
Level 5	<i>ICT professionals</i> – hardware engineers, software engineers, telecommunications engineers.

Overall impressions

It appears industry has a preference for staff who either have work-based training or university education, and university programs with a work component are the most highly regarded of all. Overall, ICT training programs may be best geared to industry needs, and promoting ICT sector growth, if they incorporate a work placement as part of the training program. This is not to under-estimate the importance of ‘traditional’ education (i.e., theoretically based with a dialogue between

² KY guidelines require that students spend one third of their course time in the workplace.

instructors and students). A Swedish Ministry of Education advisor makes a similar point and expresses concern over certificates such as the ECDL because students are taught a set of skills with no interactive learning involving creativity (Fagerlund, 2002). The most critical activities in school involve learning how to critically learn and not just listen and repeat information.

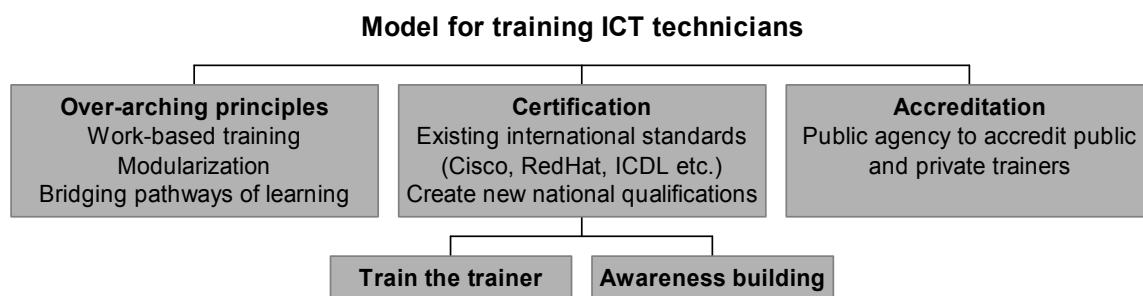
In order to obtain specialist and strategic proficiency, the optimum ICT course should have elements of vocational training, workplace exposure and theoretical education. Kunskapslyftet mostly provides a broad base of skills necessary for general proficiency and contains some elements vital for the process of learning how to learn. Similarly, KY programs outline an aim for its students to achieve “the ability to solve problems and think critically and creatively” (KY, 2002).

Kunskapslyftet provides individuals with the knowledge, competence and even self-confidence to move forward to entry-level work or further training in the ICT field. However, *KY and SwIT may be better suited to facilitate ICT industry growth because they compliment theoretical training with workplace-based training geared specifically to industry needs.* More information on Swedish ICT training initiatives is provided in subsequent sections of the report and the lessons learned in Sweden are applied to Sri Lanka and Tanzania.

ICT sector needs vary widely between Sweden, Sri Lanka and Tanzania with the three countries at different stages of development. Moreover, there are significant differences between the education and training systems, and especially available resources, in the three countries. Therefore, the reports differ somewhat in their structure to account for the unique circumstances of each jurisdiction.

In developing a model to facilitate the development of an education and training regime that promotes ICT sector growth, special attention was paid to the education and training of ICT professionals and technicians. The end result of the research are models outlining the most critical factors for ICT education and training development in Tanzania and Sri Lanka (illustrated in the recommendations following and in the chapters on Sri Lanka and Tanzania). Lessons learned from the Swedish experience were applied in a manner that recognised the specific conditions and constraints in the Sida partner countries. High-level, common components of the model are illustrated in figure 1.1 below. More detailed, country-specific models are presented in the sections on Sri Lanka and Tanzania, respectively.

Figure 1.1 Model for training ICT technicians in Sida partner countries



The reviews of Sri Lanka and Tanzania provide analyses of the ICT sectors, education and training and other relevant factors in both countries. These reports are, however, more prescriptive than the Swedish analysis, with the research directed towards formulating recommendations that Sida may support to facilitate ICT education and training to promote growth in the two partner countries.

ICT sector needs vary widely between Sweden, Sri Lanka and Tanzania with the three countries at different stages of development. Moreover, there are significant differences between the education and training systems, and especially available resources, in the three countries. Therefore, the reports differ somewhat in their structure to account for the unique circumstances of each jurisdiction.

Recommendations

At the highest level, there are three guiding principles that should be incorporated into any support of ICT skills development in Sri Lanka and Tanzania: modularization, work-based training and bridging pathways of learning.

Modularization

There has been much discussion about the desirability of developing common modules for use in training. For example, the same one-week business communication skills module could be used as part of the curriculum for trainer the trainer, technician training and in ICT training for government managers. Another common module to all streams could include the International Computer Driving License (ICDL), which is being adopted by institutions in both Sri Lanka and Tanzania. Other common modules might include basic software and networking courses for the three technician streams. International, commercial modules such as those certified by Microsoft and Cisco may also be appropriate for delivery across technical streams. It is therefore recommended that any ICT training initiative support modularization as much as possible. This not only ensures uniform quality, it also facilitate knowledge transfer to other programs and could even support commercialisation, and cost recovery, of certain modules.

Work-based training (WBT)

Virtually every person interviewed as part of this research agreed that including a work-based training component to ICT technician training is desirable. The use of WBT is a critical part of apprenticeship training, often accounting for eighty per cent of the learning process, and its use is growing for technical and university training through work placements and the use of cooperative education. WBT ensures a close linkage between industry needs and theoretical training and it also provides trainees with real work experience and contacts. It also addresses the recommendation to include practical experience in ICT training expressed in the “Lamtrac report” on Tanzania (Lamtrac, 2001:13). It is therefore recommended that work-based training be a component of the three ICT technician-training streams. Institutions in Sri Lanka and Tanzania are confident of their ability to integrate work-based training, both in the private and public sectors, into ICT training programs.

Bridging pathways of learning

It is important to ensure that ICT training is open for people with diverse backgrounds and not be a dead-end. Therefore, it recommended that Sida support development of effective bridging regimes to accompany broader intervention supporting ICT training. Bridging could allow worthy applicants to gain entry to ICT training without meeting the formal educational requirements. Learning pathways would allow ICT technicians graduates to receive advance credit if, at some point in the future they decide to pursue university-level studies to become for example, professional computer engineers. National certification bodies such as the National Council for Technical Education and Vocational Education Training Authority in Tanzania, and the Tertiary and Vocational Education Commission and National Apprenticeship and Industrial Training Authority in Sri Lanka are aware of these issues and could ensure that bridging and learning pathways are parts of new ICT training programs.

Recommendations – Sri Lanka

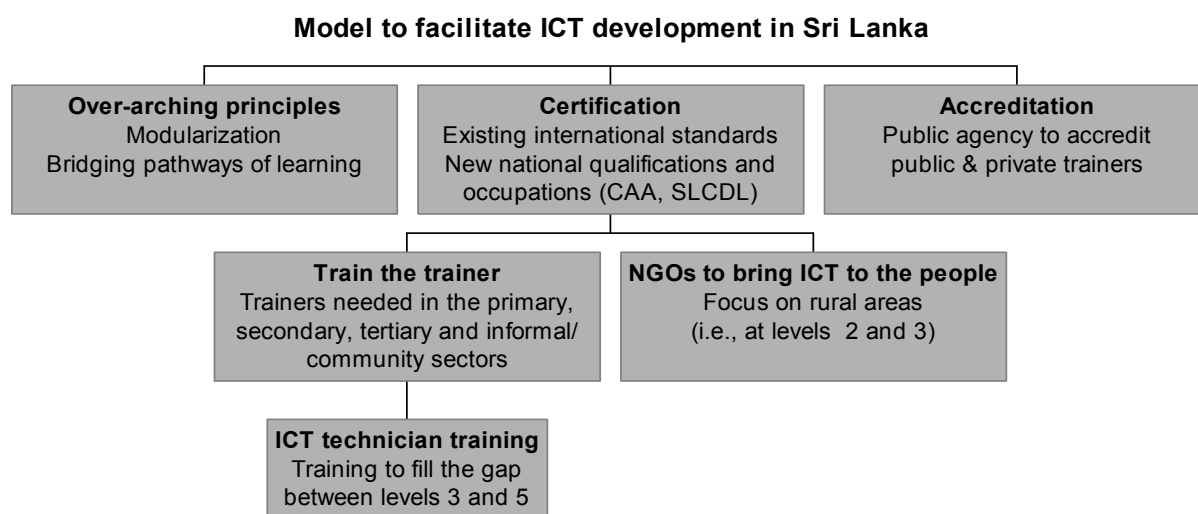
Access to ICT in Sri Lanka is quite good among those groups in the education system but non-existent for many rural residents. Many secondary schools in Sri Lanka have been equipped with ICT but are only open during school hours, and post secondary institutions have ICT but are only available for students. Private training institutions offer access to ICT but charge high fees. None of the existing public infrastructure provides access to, and training on, ICT for the millions of poor, rural residents.

Given the difficulties with governance in Sri Lanka, it may be productive to work with NGOs in the country, especially to reach the rural population. Lower level ICT awareness and training (e.g., levels 2 and 3 on our scale) could be channeled through NGOs with a strong presence in rural regions. These could be used as vehicles to provide basic ICT training and provide access to computers. For example, Sarvodaya has district centres with rudimentary computer labs that provide ICT training that is relevant to local circumstances. Therefore, it may be appropriate for Sida to work with NGOs to develop an ICT training capacity and affordable internet access outside major centres. This community-based approach could build capacity to deliver ICT services and training to rural areas. Such a strategy could focus on strengthening democracy, improving access to ICT and supporting non-formal and informal learning and would complement the World Bank's strategy to increase ICT usage in the formal education sector.

While Sweden and Sri Lanka appear to have little in common, they do share a strong commitment to education for all and Sri Lanka has potential to capitalise on economic opportunities requiring superior human capital, especially if the necessary steps are taken to expand ICT education and training. Currently the demand to attend private ICT training centres is high, despite an abundance of low quality, high cost training provided by private training institutes. Overall, growth of the ICT economy in Sri Lanka is being hindered by many factors including a lack of qualified teachers, hardware, network connectivity and standards. The most critical step in Sri Lanka right now might be to develop a

national certification and credentialing agency. A broad model facilitating ICT training in Sri Lanka is illustrated in figure 3.1.

Figure 3.1 Model to facilitate ICT training in Sri Lanka



Recommendations – Tanzania

The vast majority of those interviewed in Tanzania expressed the need for more, and higher quality, ICT training in the country. Previous reports commissioned by Sida have also arrived at this conclusion (Lamtrac, 2001; and Miller Esselaar and Associates, 2001). It is therefore recommended that Sida support the development of a program to develop ICT skills in Tanzania with the following components:

1. Train the trainer;
2. Three ICT technician streams; and
3. ICT for government managers.

The Swedish experience shows that it is possible to increase ICT competency among those without the highest levels of education. It also underscores the value of a decentralized approach where training is organized and delivered at a regional level. However, Swedish successes such as *Kunskapslyftet*, KY and SwIT are difficult to export to Tanzania because of financial constraints and different socio-political environments. Indeed, in Tanzania, there is a huge population of graduates from secondary and upper secondary school without solid employment prospects. Although this group is among the top ten per cent of the country in terms of educational attainment, their success can stimulate economic growth and social development in the country as a whole. Indeed, such an approach may be warranted given recent reports concluding that amid poverty, development assistance in LDCs should aim to increase overall economic growth, rather than concentrating only on the poorest people (UNCTAD, 2002).

Therefore, it is suggested that key lessons from the Swedish experience (e.g., affordable access, focusing on developing non-university level ICT skills, decentralized delivery, use of work-based training etc.) be incorpo-

rated into programs developed to support ICT skill development in Tanzania. At the same time, it is recognised that an approach focusing on adults with low skills levels might defy market logic in a country where there are so many recent graduates without meaningful employment opportunities. Moreover, these recommendations are not only centred on Dar es Salaam but seek to address countrywide needs.

Given the abundance of unemployed secondary, upper secondary and college and university graduates, it is recommended that ICT training be targeted to these groups. It is felt that this approach would be most successful, and best able to meet immediate industry and government demands. Moreover, clearing labour supply bottlenecks will benefit the entire country by stimulating economic growth and desperately needed government revenues.

Sida's program to support ICT training in Tanzania, a concerted "train the trainer" initiative may be required, perhaps in several locations across the country. There is a critical shortage of ICT technicians in Tanzania and a modest capacity to train ICT professionals at the university level. Moreover, the ICT technician training that is currently available in Tanzania is mainly delivered by private, for profit training institutes with variable, and often questionable, quality and very high tuition fees. Sida has supported an expansion of quality training capacity through the DIT and this could serve as a springboard for further initiatives in the country.

ICT technician training

It is recommended that Sida support a training regime that supports the development of ICT technicians in the following sub-areas:

1. Networking;
2. Software and web technicians; and
3. Telecommunication technicians.

It is estimated that these programs could provide a technical training period of approximately six months combined with six to eight weeks of work-based training.³ It is recommended that specific lessons learned from SwIT and KY be applied before supporting the development of training programs in Tanzania. The resulting knowledge transfer would increase the effectiveness of a program to train ICT technicians in Tanzania.

ICT for government managers

It is also important to build awareness of the benefits of ICT among key government workers in Tanzania. At present, the use of ICT is not being driven from the top in Tanzania and any attempt to address government efficiency through the use of ICT may ultimately fail if senior managers do not appreciate its utility. At present, government efficiency in Tanzania is hampered by not only a lack of computers but also by a lack of ICT skills among government employees. Therefore, in order to increase the efficiency, responsiveness and transparency of government, it is

³ The SwIT program used a six-month training period and showed that it was possible to train people sufficiently well to give them knowledge that was up-to-date and met industry needs.

proposed to support development of a program to train managers in government to both utilise and, more importantly, support and guide the implementation of ICT in government.

Certification and accreditation

ICT is an emerging and dynamic field without a large number of established, certified training programs. Moreover, the various branches of the emergent ICT industry are largely unorganized and have difficulty articulating core competencies required for both technical and professional staff. These challenges are similar in both Sri Lanka and Tanzania. It is therefore recommended that Sida support a national accreditation and certification process in Tanzania. This would address concerns raised about the quality of ICT training as well as create a reliable standard that would be recognised throughout Tanzania.

Awareness Building

Several officials interviewed in Tanzania suggested that building awareness of ICT in Tanzania would be beneficial. This would also address the recommendation to increase awareness of ICT in Tanzania expressed in the Lamtrac report (Lamtrac, 2001:17). Such an initiative could precede, or run concurrent to, a larger ICT technician training program. A program could be geared to the general public (e.g., through a television program) or could be focused on government employees to facilitate adoption of ICT to improve efficiency and transparency.

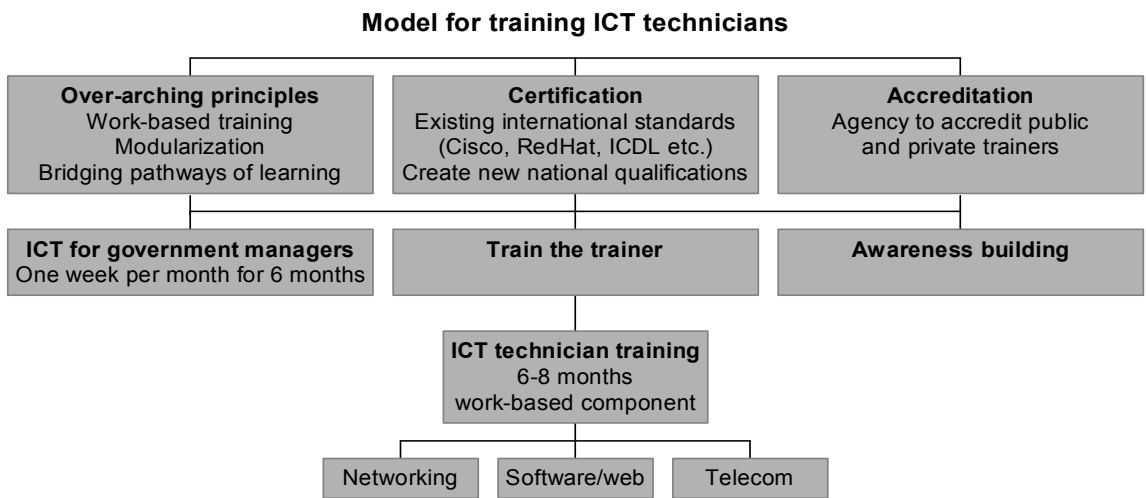
Kunskapslyftet comes to Tanzania

It may be possible to spread ICT even further and wider in Tanzania by supporting lower level ICT training. Such training could be delivered through the Folk Development Colleges (FDCs). The colleges are residential, but also run outreach courses in the surrounding villages. In total, there are 58 FDCs located all over the country. They were inspired by the Swedish experience with Folk High Schools. The colleges are essentially locally controlled and have democratic structures but they lack teaching resources as well as the infrastructure to engage in ICT training.

Modules developed for the ICT program proposed above could be exported to a broader, more democratic ICT training and awareness initiative in the future. However, it is recommended that Sida first support a program to meet industry needs for ICT technicians that would, in turn, support both economic growth and better governance in Tanzania. Therefore, any more local initiatives, such as delivering basic ICT training through FDCs, should follow a more focused program to train ICT trainers, technicians and government managers. In the future, however, a more locally based might provide good opportunities for ICT technician graduates to “spread” ICT skills throughout the country and help implement simple ICT solutions.

A broad model for training ICT technicians in Tanzania is illustrated below in figure 3.2.

Figure 3.2 Model for training ICT technicians in Tanzania



More details on the backgrounds, situations and recommendations are available in each of the three country reports in the main report.

II. Education and ICT training in Sweden

Sweden's ICT Landscape

Sweden has long been one of the leading countries in the world in investing in its ICT human resources and infrastructure and this has facilitated the country's relatively rapid movement from an industrial- to a knowledge-based society. The rich human resources of Sweden allowed many ICT companies to emerge and/or expand in the 1990s and this contributed to the superior ICT infrastructure in the country (Odero, 2002). By 2000, more than 50 per cent of all Swedish households had a PC, over 50 per cent of all Swedes had mobile telephones and every second Swede had an internet connection (Ilshammar, 2000). Perhaps most important for this study, Sweden has many public programs to develop ICT skills and facilitate ICT sector growth by clearing supply bottlenecks in the labour market.

Swedish ICT policy

Sweden's telecommunication policy, and policies in support of ICT in general, have had a positive influence on the competency of the population as reflected in the country's high ranking in "networked readiness." In the Networked Readiness Index of 2001–2002⁴ Sweden ranked fourth overall in potential to participate in the networked world. The index is made up of two sub-indexes: network use and enabling factors. Internet penetration, mobile telephone penetration and PC connectivity are the key variables for network use. Sweden ranks high on all variables because of favourable government policies and other conditions. The second, "enabling component," of the index measures networked learning, where Sweden ranks second. An important part of networked learning is investment in the development of IT skills and the quality of IT training and education programs. Sweden has a tradition of investing in human and social capital and it is within this environment that programs such as *Kunskapslyftet* (the Adult Education Initiative), *Kvalificerad Yrkesutbildning* (KY — Advanced Vocational Education) and *SwIT* (Sweden Information Technology vocational training program) emerged. Therefore, Swedish policies deserve attention.

Throughout the 1990s there was significant investment in ICT in education in Sweden. In 1994 the National Agency for Education

⁴ The Networked Readiness Index was developed by the Center for International Development at Harvard University.

(*Skolverket*) was tasked with creating Schoolnet, an internet service mainly targeted at teachers and others working in schools, and the Knowledge Foundation (*Stiftelsen för Kunskaps- och Kompetens-utveckling*) was established, partly to promote ICT. The Foundation's commitment to promoting ICT in schools generated over 100 pilot projects. A more recent initiative is the Delegation for ICT in schools (ITiS), proposed in 1998 to implement Tools for Learning - A National Action Plan for ICT in Schools. ItiS started in 1999 and supported a number of initiatives including the following:

- Training for 60,000 teachers (approximately 40 per cent of all teachers);
- Grants to improve schools' accessibility to the internet;
- E-mail addresses for all teachers and pupils; and
- Support for developing the Swedish and European Schoolnets (Swedish information society for all, 2000:15–16).

The goal was for all schools to be connected to the internet with extra grants for those schools with limited access to high speed connections.

The Swedish government has also been concerned about inequality of ICT opportunity with, for example, only 51 per cent of blue-collar workers with access to a computer at home compared to 76 per cent for white-collar workers and 84 per cent of professionals in 1998. This was partly addressed by a tax reform to encourage computer ownership and Sweden now enjoys the highest rates of computer ownership and internet access in Europe (Swedish information society for all, 2000). The use of computers and the internet also vary according to ethnicity, gender, age, income and region with, for example, people in metropolitan areas use computers and the Internet more than those in sparsely populated areas (Ministry of Industry, 2000:32). The home computer reform of 1998⁵ underscored the government's commitment to expanding ICT into all aspects of life and played a role in Sweden's high rates of computer ownership, use and access. The home computer reform also played a part in extending computers to groups who may not have otherwise had access to them. Those who signed to receive the computers were required to take the European Computer Driving License test.

In 2000, the Swedish government presented a broad IT policy framework, including an objective for Sweden to be the first country to create an information society for all. *The government noted that many citizens were missing out on ICT development and risked being marginalised, especially in rural areas without affordable broadband access.* The government's response was to invest in broadband networks, using three main approaches: 1) tax relief to encourage access to the broadband network; 2) government funding for the establishment of regional networks and broadband access in sparsely populated areas; and 3) a program to build a backbone to all municipal centres in Sweden. Overall, the Swedish government's policies to promote ICT have arguably contributed to the country's large ICT sector and relatively intensive use of ICT.

⁵ The reform 1998 enabled employees to lease a company computer for private use with tax-free loan. After two or three years, the equipment could be signed over to the employee for a nominal sum. A condition for the tax exemption was that the offer had to be made to everyone at the workplace. This allowed employees to learn the basics of computer hardware and software at their own pace.

Cooperation toward an information society for all

In the past, Swedish telecommunication legislation defined access to a home telephone as a social right. This led to the almost universal access and there are now 682 fixed-line telephone connections per 1000 inhabitants in Sweden.⁶ In the same vein, present initiatives mandate that all households should have access to broadband internet. This may be a costly undertaking given the difficulty of reaching those in sparsely populated areas of Sweden but, as in the past, implementation will largely be driven by government, with the state assuming overall responsibility for national trunk lines while the provision of local networks will be left to municipal or private interests. This division of labour between state, private companies, and local players has persisted for decades. “The development of Sweden’s infrastructure demonstrates the great extent to which government agencies and private companies have helped one another in their common endeavor to build the place up” (Ilshammar, 2000). This same kind of cooperation characterized the implementation of Kunskapslyftet, KY and SwIT.

Broadband technologies may not be the best platform for universal access because they are expensive to outlay/implement and the technology could soon be outdated. The main lesson here is the principal of government commitment to universal access as well as cooperation between the public and private entities.

It is possible that remote communities in Sri Lanka and Tanzania will see the development and implementation of wireless technologies for internet access in the years ahead because “both fixed and mobile wireless technologies fundamentally change cost structure because they reduce the time, effort, and expense of last mile delivery service, which typically comprises the majority of all infrastructure costs” (Best and Maclay, 2002:78). Indeed, some isolated communities in countries such as Canada have implemented wireless wide area networks (WANs) as a means to deliver internet service at a lower cost than is possible through traditional fixed-lines. The first task, however, is to increase the availability of fixed-line and mobile telephone services that could provide a more widely spread communications infrastructure.

Telecom deregulation may foster ICT sector growth

The Swedish telecommunications industry has been characterized by both the commitment to universal access *and* deregulation.⁷ Sweden was one of the first European countries to deregulate its telecommunications market and open it to foreign and domestic competition. Competitive pricing arguably helped spread adoption to the point where Sweden boasts 73 per cent penetration of mobile phones with 6.6 million subscribers out of a total population of 8.9 million. Moreover, there are 2.6 million internet enabled handsets and 40 per cent of wireless subscribers have internet phones (Jupiter MMXI, 2002). Overall, Sweden is among the world leaders in both fixed- and mobile telephone access rates.

⁶ Compared with 4 lines per 1000 in Tanzania (Kowero, 2002) and 26 per 1000 in Sri Lanka (CIA, 2002).

⁷ Although many argue that deregulation of telecom monopolies is a prerequisite for ICT growth, public monopoly provision prior to deregulation did provide low costs and high rates of telecommunications penetration in countries such as Sweden and Canada. Therefore, although deregulation may be beneficial, it may not be a prerequisite if public and/or private monopoly provision is efficient.

In contrast to Sweden's deregulated market are the monopolistic environments in Sri Lanka and Tanzania. Sri Lanka's telecom landscape is similar to Japan, where one telecom operator has traditionally owned all landline local loops, making local telephone call costs prohibitively expensive.⁸ Sri Lanka has a thriving and growing mobile market — in 2000 the mobile phone market accounted for 37 per cent of the total telephone market and has grown at a compound rate of 57 per cent over the past four years (Greenberg, 2002:14). It is not out of the realm of possibility that Sri Lanka could follow the Japanese path of mobile internet access. It may, therefore, be advisable to support ICT expansion and training on mobile internet technologies and applications.

The Tanzanian Telecommunications Company Limited (TTCL) was recently partly privatized with a 35 per cent stake sold to an international consortium but will retain its monopoly until 2005. Tanzania only has 150 000 fixed lines for 35 million people. Mobile telephone usage is growing rapidly and estimated at 550 000 in August 2002 (Kowero, 2002). High access costs, relative to low incomes, are the greatest barrier to increased fixed- and mobile telephone connectivity in Tanzania.

Other government policies supporting ICT

There are many other policies supporting ICT in Sweden including measures introduced in 2000 to support individual saving for continuing professional development. This helps employees allocate funds to an account for future training. Another program, called Objective 3, strengthens human capital among those already *employed* in the ICT industry. Objective 3 runs from 2000 to 2006 and is concentrated on five priority areas. The measures are formulated regionally but all serve to further strengthen Swedish human capital in the ICT sector.

The need for skills development in the ICT sector is considered when developing labour market policy. Opportunities to use ICT to create jobs and new firms are also taken into account. Equal access to ICT is promoted, especially for vulnerable groups such as immigrants and people with disabilities. There are also measures to enhance ICT competence in small businesses. Finally, there are subsidies for employers to organize staff training courses in respond to labour market conditions. To counteract shortages of labour and skills bottlenecks, people are given the chance to train in new areas of work, even if they are currently employed. These policies generally serve to improve skills supply for the ICT labour market but have also served to facilitate outplacement from ICT to areas of tight skills supply such as the teaching profession in recent years. Costs of staff training are treated as an operating expenditure and are tax deductible. The most common form of staff training for employees was in the ICT area, with 16 per cent of employees training in the ICT field (SCB, 2001:142).

Sweden – a learning-centred society

Despite many cutbacks to the Swedish welfare state in the 1990s, the country still has a reputation as a learning-centred society with high education outcomes and a well-developed network of child and, espe-

⁸ Japan's internet market development has been slowed by high dial-up costs. Meanwhile, its mobile market sees more competition and its mobile internet market has experienced a huge boom.

cially, adult learning. In its *Economic Survey* of Sweden in 1998 the OECD concluded that “education has long been a central feature of the Swedish economic and social model, embodying the objectives both of creating equal opportunities for all and stimulating long-term growth through rapid human capital formation” (OECD, 1998:83). The OECD also found that the Swedish workforce has the highest level of functional literacy in the OECD (OECD, 1998:97). Education spending and other indicators in selected OECD countries are outlined in Table 2.1.

Table 2.1 Education Indicators in selected OECD countries, 1996

Country	Public spending on education, % of GDP	Teacher salaries after 15 years experience (USD)	School expectancy (years) for children over 5 years of age	Ratio of students to teaching staff at primary level
Canada	5.4	38,000*	16.7	21.0
Denmark	6.5	31,000	17.5	N.A.
France	5.8	29,615	16.6	N.A.
Germany	4.5	38,640	16.8	21.6
NL	4.3	31,380	17.2	17.8
Sweden	6.8	23,896	19.4	13.4
U.K.	4.2	38,010	17.1	N.A.
U.S.	5.2	32,713	16.8	16.5

* Teacher salaries vary considerably across Canada. This figure is for the province of Ontario.

(Source: OECD, 2000:15–16)

Clearly, Sweden dedicates a high percentage of its GDP to education. School expectancy is the highest in the OECD, student-teacher ratios are the lowest in the OECD but teacher salaries are comparatively low. This may be because of the low salary gap that has traditionally existed between blue-collar and professional workers in Sweden. In many other countries, however, teachers earn significantly more than the average salary and low teacher salaries in Sweden are a contributing factor to shortage of teachers in the country.

Of course, education and training are not only a government matter. In the *OECD Employment Outlook* (1999) there was a review of employer-provided training across OECD countries. Sweden ranked among the highest in the OECD for employer-provided training, especially for older workers. Sweden is also characterised by a relatively equitable incidence of training, across ages, different levels of education and between men and women. These data are presented in Table 2.2 below.

Table 2.2 Incidence of training for full-time workers (per cent), 1994

Country	Total	Gender		Age (years)		Level of Education	
		Male	Female	25–44	45–54	Secondary	Tertiary
Canada	30	32	27	33	21	25	41
Germany	9	8	9	9	7	N.A.	11
Ireland	19	17	22	19	16	18	26
NL	38	39	36	39	35	39	48
Sweden	58	54	63	58	58	57	66
U.K.	59	56	66	62	52	64	74
U.S.	42	43	42	41	45	31	58
Average	36	35	50	36	43	37	56

(Source: OECD, 1999:30)

Clearly, Sweden remains a learning society with many tools to help members of the labour force in the country adapt to change. Moreover, the culture of learning, especially at the adult level through trade union study circles and adult education societies, plays an important role in Sweden's high rate of functional literacy.⁹

Education in Sweden

Sweden has long been a leading country in adult education with many innovative initiatives and, consequently, lessons for other countries. The country arguably has the best-developed system of adult education in the world and the tradition of adult education existed long before the introduction of *Kunskapslyftet*.

The basic education principle

The core principle of Swedish education policy is that basic education should be provided at school and convey a strong foundation in general subjects. All Swedes should have equal access to quality education in the state run school system. Curricula and grading are uniform during the nine years of compulsory education while the recently reformed upper secondary system is open and flexible, and gives access to higher education in both vocational and academic streams. More specialized education is often provided in the workplace.

Many see upper secondary education as a minimum and tertiary education as preferred. The basic goals are to provide a solid foundation for learning throughout life, a commitment to equity and social inclusion, openness and participation. *Kunskapslyftet* and the reformed upper secondary education system support these goals. Six per cent of upper secondary students have a mother tongue other than Swedish and many of them also receive instruction in Swedish as a second language. Over 60 per cent of the students in basic adult education were born outside Sweden, while 17 per cent of those in upper secondary adult education are foreign born (Swedish Institute, 2001).

⁹ In terms of adult literacy Sweden ranks highest among the OECD countries with 94 per cent of adults, including 62 per cent of those who did not complete high school, functionally literate. The Swedish model of adult learning is characterized by high rates of participation in study circles and other forms of informal adult education. Kjell Rubenson found that 67 per cent of Swedes with a high school education or less participated in adult education (Rubenson, 1997:367-90).

General and vocational education

Since its reform in 1991, upper secondary education has become more flexible with students in both academic and vocational tracks following three-year programs of studies. This also applies to adult education. The 1991 reforms especially opened vocational pathways, with the 14 vocational streams providing broader programs in each occupation. Despite this, some practical difficulties remain.

- The real choice available to students within any school is rather limited and students are selected according to their grades rather than their preferences.
- 85 per cent of class time is devoted to centrally determined subjects. The limited proportion of time devoted to non-core subjects makes it difficult to be responsive to local labour market needs.
- More skilled teachers are required and there is a need to establish a better link between the classroom and the workplace.

The link between school and work life takes a number of forms: practical work life orientation in compulsory school; career education and guidance; work experience during upper secondary school; advisory or other forms between individual schools and local employers to improve program development and implementation; and formal relationships between employers, trade unions and education policy makers.

Overall, the Swedish education system is characterized by high levels of public spending on everything from compulsory school to popular movements, with significant funds targeted to people with low levels of education. Sweden also has a long tradition of social partner participation in education including in regional growth agreements, employment services committees and on boards overseeing Kunskapslyftet and KY.

Compulsory education

Basic schools and schools for the Saami, children with special needs and for the mentally disabled are compulsory for nine years. Children may start school at the age of six or seven. In 1998, responsibility for pre-school activities and school child-care was transferred from the Ministry of Health and Social Affairs to the Ministry of Education and Science, underscoring the importance of early childhood education and care as a foundation for lifelong learning.

Upper secondary education

Municipalities provide upper secondary schooling for all residents who start studying before the age of 20. There are also a number of tuition-free upper secondary schools run by private providers, mostly in major urban areas. Schools utilise a points system, based on the number of hours allocated to each course, to determine whether a program is completed. The syllabi ensure continuity with compulsory school and state the goals of the course as well as the knowledge and skills students should achieve on completion of the course. The government issues syllabi for all eight core subjects (Swedish, English, civics, religious studies, mathematics, natural sciences, physical education and health, and fine arts) while Skolverket determines the syllabi for other subjects (Swedish Institute, 2001b).

Students choose between 16 national programs, 14 of which are vocational and two geared to preparing students for university. In addition to national programs, municipalities may establish programs adapted to local needs and conditions. Core subjects account for about one-third of total study time. In vocationally oriented programs¹⁰ at least 15 per cent of the time is spent at workplaces (this is optional in theoretical programs). School supervisors are responsible for the procurement of training opportunities and for supervision during workplace training.

There are also a number of IT Upper Secondary Schools in Sweden. One organization (IT Gymnasiet, www.it-gymnasiet.se) operates IT secondary schools in Kista-Rissna, Göteborg, Huddinge, Uppsala and Västerås.

The IV individual program

In 1998, 98 per cent of the cohort leaving compulsory education continued to upper secondary education, of which eight per cent (115,507 students) started the individual IV program (Skolverket, 1999). Students who do not succeed in the three core subjects either in compulsory or upper secondary education – Swedish or Swedish as a second language for immigrants, English and Mathematics – are streamed towards the IV program. This program allows students to combine a traineeship in a company with studies in upper secondary education. These programs are personalised to suit individual needs and have the following objectives:

- Assisting students who have difficulties with the upper secondary program;
- Allowing young people who need remedial teaching to complete compulsory education; and
- Allowing young people to combine studying upper secondary education subjects with a job that teaches vocational skills.

The purpose of the IV initiative is to give students the opportunity to acquire knowledge and obtain a diploma. Since the IV program is based on student needs, it can vary both in duration and content. The program can also be used for specialised vocational training or for apprenticeship training combined with upper secondary studies.

Adult education

The public school system for adults targets those above the age of 19 and is regulated by the School Act of 1996. The system is comprised of municipal adult education (KOMVUX) and SFI (Swedish for immigrants). As with youth education, municipalities are responsible for running these schools. KOMVUX has existed since 1968 and includes basic adult education and upper secondary adult education. *Basic adult education* provides training equivalent to that offered by the compulsory school system and is a right for everyone – municipalities *must* make it available to all citizens who require it. For *upper secondary adult education*, municipalities are obliged to provide opportunities corresponding to individual needs. Studies within KOMVUX lead to formal qualifications in individual subjects or a compulsory or upper secondary school certifi-

¹⁰ The following national programs are vocationally oriented: arts; business and administration; construction; child recreation; electrical engineering; energy; food; handicraft; healthcare; hotel, restaurant and catering; industry; media; natural resource use; and vehicle engineering.

cate. Education is organized in separate courses and students can combine studies with employment. Students choose their own study program and can combine studies at the basic and upper secondary level. There are no entrance requirements or leaving examinations. Adult education enrolment trends are outlined in table 2.3 below.

Table 2.3 Number of students in adult education, 1998

Educational level Responsible Authority	Number of students	Of those (%)			Courses/ student
		Women	born abroad	persons that study during evenings	
Basic	47,705	63.9	59.8	12.8	3.3
Upper-secondary	260,612	65.9	16.3	19.2	5.7
Municipal	253,398	65.3	16.8	19.7	5.6
County council	7,214	86.5	0.6	1.4	10.4
Supplementary ed.	8,381	52.1	10.8	4.0	8.9
Municipal	7,123	50.0	12.0	4.7	9.1
County council	1,258	64.1	4.1	0.0	7.9
All levels	316,698	65.2	22.7	17.8	5.4
Municipal	308,226	64.7	23.3	18.3	5.3
County council	8,472	83.2	1.1	1.2	10.0

(Source: SCB, 2002).

Supplementary adult education

Supplementary adult education provides vocational courses not available in youth education leading to higher professional or trade qualifications. Participants train for a period of six months to one year and the focus is mainly on subjects such as economics, computing and tourism. There are two national schools for adults (SSV) outside the public school system run by the state. Instruction in SSV supplements KOMVUX and is structured around a distance-learning model. Much of Sweden's supplementary vocational education is provided in upper secondary schools but there are also many post secondary providers of continuing vocational training such as public institutions (e.g., KOMVUX and folk high schools), trade unions, employers' associations, private enterprises and training companies.

University

Those who complete upper secondary school with a passing grade in 90 per cent of the core subjects fulfil basic university admission requirements. Adults can also access university if they fulfil the 24:4 rule (i.e., over 24 years old and have worked at least half time for 4 years). The government increased university capacity by 89,000 full-time spaces between 1997 and 2002, which will allow 50 per cent of the cohort leaving upper secondary school to start university before the age of 25. Many of the new spaces were created in regional centres as the government converted some of the larger colleges into full universities. All of Sweden's universities have various degree programs related to ICT and the larger institutions offer a wide range of ICT programs.

Sweden's IT-university

In addition to comprehensive programs at many existing universities, a university solely dedicated to IT was recently created. The IT-university in the Stockholm suburb of Kista is located at the center of one of the worlds leading clusters for mobile communications and information technology. The presence of so many leading ICT companies facilitates the dynamic collaboration with industry so vital for technical universities. It is an ambitious project solely focused on ICT technology ranging from nanotechnology to human interaction with technology.

The IT-university is a joint project of Stockholm University, the Royal Institute of Technology (KTH) and other institutions, which have a goal to develop the Kista institution into one of the world's leading IT universities for research and education. The IT-university has departments of Microelectronics and Information Technology; System and Computer science; and Applied Information Technology. In 2002, the IT-university had approximately 7,000 students, half of whom were full-time students. The university's budget is about SEK 500 million but enrollments dropped significantly between 2000 and 2002 thanks, in part, to the IT industry slump in Stockholm.

The Swedish Net University

The Swedish government also recently created the Swedish Net University. It is a dual or multi-modal university based on courses and programs already given by existing Swedish universities and university colleges. As an initial incentive, these institutes of higher education will be given extra funding (211 million SEK for year 2002) from the government, for courses offered via the Net University. Participation in the Net University is voluntary for the universities and university colleges but most participate. The extra resources supporting web-based learning will be in effect through 2003 and will also help build a strong brand name for Swedish distance education provided by Swedish universities (www.netuniversity.se).

In order to run the project the government created a state agency to organize the Net University, based in Härnösand in the geographical middle, but demographic North, of the country. The primary task for the agency is to coordinate the various courses and education given by the various Swedish universities, rather than developing new courses (Hansson, 2002). The agency has an annual budget of about 35 million SEK.

Sweden's active education policy

In 1995 the Adult Education Initiative (*Kunskapslyftet*) was developed to expand adult education and training with the realisation that major structural policy measures were needed to break the trend of rising unemployment resulting from the sharp recession in the early 1990s. The initiative was to contribute to a halving of unemployment to four per cent by 2000. The other motivation behind Kunskapslyftet was the desire to 'kick start' policies for the development of lifelong learning in Sweden. It was also seen as a way to revise active labour market policy

and renew adult education with respect to financing arrangements, structures, contents and working methods. It promoted the idea that unemployment was no longer necessary to qualify for policy intervention. Under *Kunskapslyftet*, not having the equivalent of a full foundation for lifelong learning also suffices as grounds for eligibility (Tuijnman, 2001).

Labour market policy is the responsibility of the National Labour Market Board (AMS — *Arbetsmarknadsstyrelsen*) and implementation is organized by the Labour Market Training Agency (AMU), recently transformed into a state-owned enterprise competing with other training providers. Both AMS and AMU are highly decentralized, with AMS determining training needs locally and AMU centres offering courses for the unemployed and “at risk” employees. County labour boards (*Länsarbetsnämnder*), comprised of representatives from municipalities, trade unions and businesses, are responsible for labour market affairs at county level including responsibility for employment offices, employability institutes (AMI) and working life services. Local employment services committees shape labour market policy to suit local conditions.

Over 400 employment offices (*arbetsförmedling*) are situated in most municipalities and cater to the unemployed as well as individuals wanting to switch occupations. Employment offices also offer recruitment and placement services for employers. In larger centres there are specialised offices to cater for specific occupations such as those in health and social services, and ICT. In February 1999, 180,000 people were in labour market policy programs including 50,000 in labour market training. Although the main goal is to obtain employment in the regular labour market, furthering education or training, or early retirement are also common paths.

Informal learning

High rates of participation in study circles and other forms of informal adult education characterise the Swedish model of adult learning. Other factors that may facilitate high literacy in Sweden include a comprehensive early childhood education system; widespread library system; high rates of employer-sponsored training; the role of unions and other popular movements in promoting adult education and study circles; the long history of compulsory education and/or the role of church in promoting reading in the nineteenth century; or even the strong, unitary state. Since the late nineteenth century, Swedish adult education has been characterised by study circles and folk high schools. Educational programs offered through study circles are organized by eleven nation-wide voluntary educational associations, often affiliated with political parties or interest organizations. An overview of participation study circles is provided in table 2.4.

Table 2.4 Overview of study circles in 1997/1998

Association organizing study circle	Study circles	Participants		Hours of study	Participants/ study circle	Hours/ study circle
		Total	Women			
		ABF	96,149			
FS	15,650	139,711	85,036	519,266	8.9	33.2
FU	17,868	161,128	106,393	806,410	9.0	45.1
Sfr	35,516	261,009	129,486	1,608,923	7.3	45.3
KFUK/M	3,879	32,817	18,984	153,330	8.5	39.5
SV	58,453	507,693	304,784	2,096,655	8.7	35.9
NBV	21,659	154,897	85,445	763,953	7.2	35.3
SISU	29,639	224,775	85,662	785,779	7.6	26.5
Mbsk	25,099	222,888	141,524	1,001,590	8.9	39.9
SKS	17,186	197,438	124,904	615,487	11.5	35.8
TBV	10,719	85,338	45,661	493,988	8.0	46.1
Total	331,817	2,815,679	1,612,262	12,458,081	8.5	37.5

Source: SCB (2000).

Adult education outside the public school system is also available at folk high schools, mainly residential and owned either by county councils or by trade unions, churches and other non-profit organizations. Folk high schools and voluntary educational associations are subsidised by the state, but the organizers develop the courses.

Swedes have a long tradition of taking part in popular movements – such as study circles and folk high schools. The entire population enjoys a high literacy level and this environment creates a need for further education. Boudard (2001) confirms this view by examining major antecedent factors influencing participation in adult education within countries that participated in the International Adult Literacy Survey (IALS).¹¹ The most important factor was literacy practices (e.g., informal learning such as reading and using ICTs) both at work and at home.¹² Indeed, Swedish residents are among the most avid newspaper readers in the world with a circulation of about 3.8 million, or 430 copies per 1000 inhabitants. Swedes are also among those who read books and participate in community activities most frequently (OECD and Statistics Canada, 2000:48–50). Moreover, 90 per cent of central government employees have access to computers as do a majority of those working for local government and the private sector (Ministry of Industry, 2000:32). The government is also investing in a network that will allow fast internet access to all Swedes.

¹¹ The IALS was the first comprehensive assessment of adult literacy skills ever undertaken, with over 75,000 adults from 22 countries assessed between 1994 and 1998. Sweden ranked first among the IALS countries in terms of the percentage of the population with functional literacy (the minimum level needed to participate in the knowledge economy). Kunskapslyftet was launched in an era of growing appreciation of literacy, now recognized as an important factor in the economic performance of countries, and it helps lower-skilled Swedes participate in an increasingly knowledge-intensive economy. Functional literacy must be more widespread in order to achieve higher rates of labour force participation.

¹² The indicator is composed of three variables: reading at work; writing at work; and reading at home.

Kunskapslyftet — the Adult Education Initiative

Kunskapslyftet was initially a five-year program of investment in adult education, which started in 1997. It was part of a larger initiative to reduce unemployment by 50 per cent, but the underlying ideal is to support a comprehensive national expansion of knowledge, to update adult education and to create a populace that can compete in the global market. In the 1980s and 1990s the Swedish Parliament debated the question of how Sweden could emerge as a vital, thriving, economy in the years to come. It was agreed the country could not compete with cheap labour, so the alternative was to create a knowledge society. In this spirit, Kunskapslyftet (the “knowledge lift”) was born.

Kunskapslyftet is financed by the state, but administered by municipalities. The state contributes a special government grant of about SEK 3 billion a year, which supports an estimated 100,000 full-time study places. Kunskapslyftet reaches groups with low levels of education with 5000 spaces in 2000 earmarked for adult basic education (Ministry of Industry, 2000:13). Almost 60 per cent of course participants have been over the age of 30 and the less educated (i.e., two years or less of upper-secondary education) have accounted for two-thirds of participants. Kunskapslyftet has also supported an increase in vocational courses and results show that “the prioritised target groups are reached to a higher degree the longer the initiative is in force” (Ministry of Industry, 2000:5). The program was recently renewed through 2003 and trade unions will target outreach activities to reach those with low levels of education and motivation. It is difficult, however, to gather statistics focussed solely on Kunskapslyftet because it is integrated with KOMVUX in many municipalities (Skolverket, 2001).

At the national political level, Kunskapslyftet is designed to serve several broad policy objectives.

- *Labour market policy*: reduce the burden on active labour market policy and divert unemployment insurance funds to training/education. Labour market training was reformed and tied more closely to jobs and labour bottlenecks and social partners were given a larger role to play steering training than before.
- *Economic policy*: stimulate growth by improving human capital and the flexibility of the labour force.
- *Industrial policy*: improve conditions for small firms and self-employment by providing the skills required for local labour markets.
- *Social policy*: reduce the gaps between knowledge “haves” and “have nots,” and widen eligibility for admission to tertiary education.
- *Education policy*: improve the infrastructure for lifelong learning by 1) introducing competition to adult education, even to for-profit institutions which accounted for over 20 per cent of supply in 1999; 2) renewing upper secondary education, especially vocational streams which accounted for 44 per cent of supply in 1999; 3) strengthening the regional orientation of education policy by creating new colleges and universities; 4) improving the applied orientation of KOMVUX programs; 5) improving education policy coordination across government and raising the profile of education; 6) reforming the system for study finance; and 7) creating job openings through a rotation scheme where adults without upper secondary education obtain funding to

leave work for full-time study if the employer agrees to recruit an unemployed person to fill the vacancy (Tuijnman, 2001).

The scale of *Kunskapslyftet* is enormous, with a goal to reach 20 per cent of the labour force. Consequently, the initiative is very costly, though much of the funding was merely reallocated from the budget for unemployment insurance. Target groups are the long-term unemployed as well as adults without upper secondary education. Among the latter, preference was to be given to those working in sectors adversely affected by structural change. In line with the principles of lifelong learning advocated by the OECD, the learning needs and personal situation of the learner shape the structure, content and working methods of the initiative. The provision of education and training are organized to allow individual solutions in terms of study orientation and supply. These objectives are achieved by implementing measures to reduce the barriers to adult education participation by providing more information and guidance, and offering new access to study financing. Another factor is flexibility in the supply of learning opportunities, with long opening hours, modular programs and distance education modes. Improved pedagogical methods, including prior learning assessment are other features of the program. The initiative promotes new methods to assess, evaluate and validate knowledge and skills. Finally, improved relevance of education, especially vis-à-vis the labour market, was targeted.

Kunskapslyftet required broader reforms

In order to facilitate implementation new tools were required. These included new contractual obligations between the state and municipalities, which were given the responsibility to implement the program. It also led to a new emphasis outcomes, with municipalities assuming responsibility for organizing the supply of adult education. Within the Ministry of Education and Science an independent government committee were created to oversee the implementation of the program (Rubenson *et al.*, 1999). At the same time the Ministry of Labour was dismantled and its functions absorbed in an enlarged Ministry of Industry. Recruitment subsidies were phased out following the introduction of *Kunskapslyftet* but more funding was allocated to help people start new firms and become self-employed. While relief work programs were also cut drastically, work life introduction grew in importance as the government tried to reduce market failure by improving the supply and quality of information about education and job opportunities and about the functioning of the labour market. The coverage of youth training schemes was cut in favour of activity centres, and municipal adult education programs for young people were expanded. As labour market policy programs were reduced, the number of full-time study places in general municipal adult education expanded to 228,000 places in 1999 (SOU 2000:28).

Combining equal opportunity with economic growth

Ultimately, *Kunskapslyftet* is designed to reduce unemployment; renew adult education; reduce differences in levels of education and inequities for those with low education levels; and improve the conditions for

economic growth. It is also supposed to assist participants in achieving the necessary qualifications and competence to study at a higher level. The initiative was mostly seen as the means to increase employability and further people's development in their work (an emphasis was also placed on counselling to ensure learning was complimented by personal development) but an unexpected benefit was the increased levels of self-confidence of participants (Fagerlund, 2002).

The policy philosophy is best summarized as a focus on individual achievement as the basis for employment and growth, rather than a manipulation of economic aggregates (Söderström, 1997). AMS had a conflict with the educational policy developers because they primarily aim to fill labour supply gaps while the educational philosophy was to give the individual what they wanted. The conflict was partly resolved by requiring individuals to consider the labour market, and occupations in demand, before deciding on programs to increase their competence. Ideally, participants find programs that are both interesting and qualify them for employment.

Exporting Kunskapslyftet to developing countries

Addressing the needs of the individual is laudable but many countries do not have the luxury of this approach. Samaranayake argues that human resources can be classified into two components: knowledge/skills and human development. How human resources are developed and how the skills supply can be matched to the labour demand need to be analysed. While every citizen is free to pursue their interests, Sri Lanka cannot afford to provide free and subsidized education to suit individual needs at the expense of national needs (Samaranayake, 2002: 2). Therefore, given limited state and donor resources it may be more appropriate to build focused, small-scale ICT training programs in Sri Lanka and Tanzania from the perspective of the labour market rather than the individual.

Planning on a centralized, decentralized model

Prior to implementing Kunskapslyftet a steering group was formed with members from the Ministries of Education and Science; Health and Social Affairs; and Industry, Employment and Communications; and representatives from AMS, the Trade Union Confederation (LO — *Landsorganisationen*); business (now called the Confederation of Swedish Enterprise or *Svenskt Näringsliv*); and Skolverket. A secretariat of five people headed by a senior bureaucrat and including experts on municipalities, folk high schools, AMS and adult education worked to implement the initiative. The secretariat divided Sweden's 255 municipalities among them and met with local representatives from AMS, education boards and social partners to determine local needs. They met regularly to share challenges and channel concerns directly to the highest levels of government, which could smooth implementation. Administration of the program was ultimately assigned to Skolverket.

Kunskapslyftet's co-ordinated program development effort, involving ministries, agencies, local governments and social partners is exportable to Sri Lanka and Tanzania. Indeed, in rural countries such as Sri Lanka and Tanzania, where ICT activity is concentrated in Colombo and Dar Es Salaam, this kind of model is especially important. The secretariat

that organized Kunskapslyftet focused on local needs and explained how municipalities and local social partners could engage the initiative. And once the program was implemented, administration was delegated to the local level.

Finance on a centralized, decentralized basis

All municipalities are required to participate in Kunskapslyftet and charged with building an infrastructure for learning that corresponds with the needs of the individual and society. To support the initiative, the government earmarked SEK 3 billion of funding per year. Municipal authorities apply for funding, and it is allocated according to the number of people unemployed and/or with a low level of education in the municipality. In their applications, local authorities are required to detail the planned scope of general education courses, vocational courses and orientation/counselling programs. In order to provide as wide a variety of courses as possible, municipalities, county authorities, national schools for adults, adult educational associations, folk high schools and private training companies work together (Skolverket, 1999).

Prior to the implementation of Kunskapslyftet, each municipality received funds for planning and development purposes. Municipal authorities receive approximately SEK 26,000 for every full-time equivalent (FTE) space offered in traditional subjects such as math, English or Swedish. The amount received is approximately SEK 36,000 for each FTE offered in vocational subjects because of the higher cost of delivering these programs. Municipalities can also apply for earmarked funds for special initiatives, such as recruiting women for non-traditional careers. Kunskapslyftet funding is earmarked exclusively for adult education though it can be used for teacher salaries, training facilities, counseling initiatives or other purposes.

Student financial support

Those studying under Kunskapslyftet have access to the following kinds of support.

- 1. UBS** (special grant for education and training) — for adults who are either unemployed or employed but with a low level of education. They must be between 25 and 55, study at primary or secondary levels and be eligible for unemployment assistance.
- 2. SVUX** (special adult study assistance) — for those with a low level of education who take a leave of absence from their job to study at primary or secondary levels. Support takes the form of grants and loans. To qualify, individuals must have at least four years of work experience and be aged 50 or younger.¹³
- 3. SVUXA** (special adult study assistance for the unemployed) — available for those 21 to 50 years of age who are unemployed and registered job seekers who intend to study at the primary or secondary levels, on condition that they have worked for at least three years.

Overall, 76 per cent of students with financial assistance were referred from AMS (Skolverket, 2001: 21). Slightly less than half of those partici-

¹³ Those over 50 with special circumstances can qualify for SVUXA or SVUX.

pating in Kunskapslyftet utilize financial assistance while just over half utilize “other financing” including social assistance, unemployment insurance, bank loans or independent sources.

Curriculum development

Kunskapslyftet can be divided into national and local courses.¹⁴ For national courses, government develops syllabi for core subjects (e.g., Math and Swedish) while other subjects are the responsibility of Skolverket. Syllabi for nationally developed vocational courses are revised every third year. A representative committee exists for each of the 16 vocational programs and social partners meet to consider changes but ultimately Skolverket is responsible for curricula. Syllabi for local courses are developed by municipal education and training boards but they match national standard courses in terms of grading and criteria. Curricula exists for many vocational programs but curriculum development is difficult for ICT courses because of the lack of industry associations to articulate training needs and standards. Consequently, private companies are often contracted to develop ICT curriculum and identify training needs. Despite the fact that no funding is provided to develop curricula, there is a balance between locally and nationally developed courses funded through Kunskapslyftet.

Kunskapslyftet and ICT

The Swedish Business Development Agency (NUTEK) is the country’s public authority for industrial policy issues and has a task is to promote sustainable growth throughout the country. NUTEK defines ICT education as courses or programs containing a core of ICT subjects such as computer science, computer technology, electro-technology and/or information/systems science (NUTEK, 1999). These types of courses are the most popular group of subjects offered through Kunskapslyftet.

Municipalities are responsible for implementing Kunskapslyftet and they have great latitude in organizing training programs. For example, an ICT program in Eskilstuna is offered through the KY framework and is a cooperative effort between KOMVUX, three municipalities, local business and Mälardalens Högskola. Some of the private sector companies participating in the ICT program in Eskilstuna include Volvo, Prosona Gruppen, Eyescream, DEVA technologies and JA Produktutveckling (www.komvux.eskilstuna.se/itsam/index.htm). This two-year program consists of courses in applications; operating systems; project leading; computer communication; database programming; IT support; IT security; networking; web design; and work placements comprising one-third of the program. It results in “specialist proficiency” as outlined by the Ministry of Industry (Level 4 on our scale) and is meant to lead students to jobs such as IT coordinator, technical specialist, educator, and program or support specialist. Students completing this program receive an advanced vocational (KY) diploma (and 80 points).

Most ICT courses offered through Kunskapslyftet are not as formal and structured as the program in Eskilstuna. For example, programs

¹⁴ It is generally felt that the nationally developed courses offer more uniform quality, though some locally developed courses have been very innovative and successful.

offered only through the auspices of KOMVUX such as the one- and two-term data courses in Arvika. The one-term “data basic course” offers classes in applications such as Word, Excel, database and presentation software, general IT knowledge and internet usage (level 3 on our scale). The two-term program is for those who have completed two or three years of upper secondary school, or its equivalent, but is not for those who wish to continue to higher education in the field of engineering. After this education, the student can manage and maintain PCs and local networks in small companies, function as data support for company personnel, manage internet and e-mail programs, and have basic knowledge in C++ programming. Courses include IT English, Operating Systems, PCs, local networks, web design, programming, workstations, Linux server systems and others.

Division of education/training by field

Of all the subject areas offered via Kunskapslyftet, ICT-related courses have had the largest share except for the first year of the program when mathematics courses were most popular. Since the autumn of 1998, ICT-related courses have had the largest share of both full-time spaces and participants. Training by field, for the six most popular areas, is highlighted in table 2.5 below.

Table 2.5 Continuing education divided by subject and per cent

Subject	Share of fulltime spaces (%)					Share of participants (%)			
	Fall 1997	Fall 1998	Spring 2000	Fall 2000	Spring 2001	Spring 2000	Fall 2000	Spring 2001	
English	8,4	7,6	5,5	5,6	5,1	6,0	5,7	5,4	
Business Administration	5,0	4,7	4,2	4,3	4,5	5,4	5,8	6,1	
Math	12,2	11,0	8,5	8,2	7,6	9,3	8,3	8,0	
Social Sciences	6,1	6,0	4,2	3,7	3,7	3,5	3,0	3,0	
Swedish as a 2 nd language	11,3	10,7	7,6	7,2	6,9	6,6	6,4	5,9	
ICT-related courses	11,1	13,4	10,4	10,0	10,0	11,8	11,4	10,9	

(Source: Skolverket, 2001:13–14)

Private sector contributions

Since Kunskapslyftet was launched in 1997, private sector organization and delivery of courses has more than doubled. No study was undertaken to investigate this trend but Anita Barger, Kunskapslyftet officer at Skolverket, identifies a number of underlying factors that may explain the increasing role of private sector training: 1) the magnitude of the initiative and the huge volume of courses motivated municipalities to seek outside help in order to offer more courses; 2) at the start of Kunskapslyftet there were many theoretical courses, but with the increase in vocational training programs and ICT-related courses, outside help was needed. Overall, the increasing role of private sector training firms was more prominent in urban areas than in less populated areas (Barger, 2002). This suggests that any large-scale ICT training initiatives in Sri Lanka and Tanzania may have to involve both the public and private sectors. The division of Kunskapslyftet training by provider-type is outlined in table 2.6 below.

Table 2.6 Division of education by different organizers

Education Organizer	Share of fulltime spaces (%)				Share of course participants (%)			
	Fall 1997	Spring 2000	Fall 2000	Spring 2001	Fall 1997	Spring 2000	Fall 2000	Spring 2001
Municipality	78,4	73,3	72,9	70,7	78,2	73,1	71,8	70,2
County	7,9	1,3	1,1	0,9	7,0	1,6	1,4	1,1
Folk High Schools	1,3	1,3	1,2	1,2	0,5	0,4	0,5	0,5
Study Groups	3,1	4,2	4,5	4,8	2,6	3,9	4,2	4,2
Other Organizers	9,3	19,9	20,4	22,4	11,6	21,0	22,1	23,9

Source: (Skolverket, 2001:14)

Generally speaking, Kunskapslyftet is inexpensive to implement (on a per seat basis) because many of the facilities already exist in the form of KOMVUX centres, already a part of the Swedish learning landscape. To the degree it exists, the utilization of existing infrastructure would also result in lower training costs in Sri Lanka and Tanzania.

Evaluation of Kunskapslyftet

After the five-person team responsible for managing contacts between the central government and municipal authorities transferred administration of the program to Skolverket, an evaluation regime was established with reports published twice yearly.

Between the autumn of 1997 and 1999, over 536,000 students finished their studies within Kunskapslyftet. Overall, 492,840 individuals participated in at least one course at the secondary school level. The share of students who took a break from their studies was highest in the first half year at 27 per cent and lowest in spring 1999 at 15 per cent. Of those who took a break from studies, 18 per cent did not complete their studies (Skolverket, 2001). While there was no study to investigate the reasons behind non-completion, a typical “positive” factor includes people who left the program to take jobs while a common “negative” factor includes those without sufficient funding to continue studies (Barger, 2001). Non-completion is costly because municipalities are funded for participants who attend for three weeks or more. For example, in the spring of 1998 SEK 128 million was dispersed for courses not completed – 7.5 per cent of the Kunskapslyftet budget for that term. Some studies in other jurisdictions have revealed that program completion rates increase when students have a financial stake (e.g., pay a portion of the training costs) in their training. This may not be an appropriate mechanism for Sweden but it may be in Sri Lanka and Tanzania where government resources are limited and cost sharing may allow more training to be offered.

Broadly speaking, there are concerns regarding the funding formula for adult education in Sweden. Government pays municipalities to offer a predetermined level of training spaces a year for unemployed adults. Training should be tailored to meet individual needs, but also increase the participant’s employability or provide skills for higher education. However, central government funding is solely tied to training spaces and there is no mechanism to ensure training is linked to labour market demand. Moreover, there are no mechanisms to monitor, measure and

assure quality. It may be wise for such mechanisms to be established in Sida partner countries where local government's may not be as transparent, or as administratively robust, as those in Sweden.

In terms of outputs, 16 per cent of *Kunskapslyftet* completers were registered as unemployed, five percent were engaged in AMS programs and 14 per cent were engaged in post secondary studies a year after completing their studies. For those who quit studies, 17 per cent were unemployed, five per cent in the AMS labour market measures and 11 per cent were engaged in post secondary studies (Hedén, 2001:5). Anders Stenberg at Umeå University concludes that participation in *Kunskapslyftet* decreases both the incidence of unemployment and its duration compared with regular labour market training. He also finds a positive effect relative to labour market training for foreign citizens, females and individuals with at least two-years of upper secondary school (Stenberg, 2002). Overall, *Kunskapslyftet* underscores the need for a more flexible approach to adult education, where working individuals and other adults could have opportunities to improve their skills (Ministry of Education and Science, 1999).

Conclusions on Kunskapslyftet

In Sweden, traditional higher education paths such as universities and colleges have supplied highly skilled professionals but the market has failed to provide sufficient numbers of non-professional ICT technicians. *Kunskapslyftet* focuses on those outside the knowledge economy and is an important tool to raise skill levels in the transition from an industrial- to a knowledge-based economy. As highlighted above, the method of implementing *Kunskapslyftet* provides lessons for ICT training initiatives in Sida partner countries. The “central decentralized” approach, the active collaboration between social partners and the commitment to lifelong learning serve as models.

Some of the more intensive courses offered through *Kunskapslyftet* equip students with the skills to work with database management, network management and support, or programing. For the most part, however, the skills gained in *Kunskapslyftet* are more appropriate for enabling the efficient functioning of business.¹⁵ It is important to note that 70 per cent of *Kunskapslyftet* programing was delivered through KOMVUX and was mainly geared to entry-level ICT such as common business applications. Therefore, courses offered through *Kunskapslyftet* are more of a precursor to more specialised ICT training programs at higher education levels than a direct route to working in the ICT field. In the sections below an overview of vocational programs that have proven to be successful in Sweden, and may be more applicable to SIDA partner countries given their more limited scale and orientation to industry needs, is provided.

KY — Advanced Vocational Training

From 1996 to 2001 a pilot project implementing Advanced Vocational Education (*Kvalificerad Yrkesutbildning* — KY) was implemented emphasising workplace learning.¹⁶ Although the range of post-secondary programs is

¹⁵ The programing courses are an exception and can lead to the development of actual IT products.

broad in Sweden, many fields lack work-based training opportunities. KY courses combine classroom-based learning with practical experience and attempt to pioneer new post secondary courses, teaching methods and training arrangements. The KY model facilitates the development of innovative programs using new education forms and course providers.

KY education is post-secondary, in the sense that completed upper secondary education or equivalent knowledge is a requirement, but program development is driven by the labour market. Consequently, the KY approach provides a good model for Sida partner countries wanting to promote sector-based economic development. Programs are offered in many sectors including engineering, trade and tourism, agriculture and forestry, health care and ICT.¹⁷ Unlike *Kunskapslyftet*, which is aimed at those who did not finish upper secondary schooling, KY programs target those who recently left upper secondary school or those employed but wanting to further develop their skills. KY does not provide funding for curriculum development but funds training delivery and supervises and evaluates the overall initiative. Training organizers such as local authorities and private companies can apply to the committee to start a KY course but the committee prioritises programs that help counteract bottlenecks in the labour market. Course providers recruit students.

KY programs also offer “cross curriculum skills” such as the ability to work in a team, communicate and solve problems. KY courses are based on co-operation between business and trainers (e.g., higher education, private trainers, KOMVUX, etc.) to meet the demand for traditional competence as well as soft skills. As KY is based on local labour market needs, and to ensure occupational concerns are addressed, representatives of working life (i.e., from industry, local authorities, higher education and training arrangers) decide on course management. KY courses are carried out under the supervision of the national committee for qualified vocational training.

KY programs are at least 40 weeks long and programs consisting of 80 points (i.e., 80 weeks) or more leads to a KY certificate or diploma.¹⁸ Course providers wishing to provide KY courses must submit an approved program to ensure quality. The workplace-training element of KY is important and requires active participation by employers in designing the courses. To satisfy basic requirements, workplaces used for practical training must be organized to facilitate learning. Training should also help to minimize gender segregation of occupations and stimulate women’s interest sciences and technology careers. The KY program has the following broad characteristics.

- Programs are usually initiated, and developed, by industry.
- Programs are only approved if there is a clear labour market need.
- Initially, programs were broad but have become increasingly focused.
- Funding averages SEK 55,000 per student year but varies significantly, depending on training costs as negotiated between KY and the provider.
- KY staff visit all training centres annually to ensure quality.

¹⁶ The pilot began in 1996 but is now a permanent part of the government’s support for adult education.

¹⁷ Approximately 25% of KY training was in the field of ICT.

¹⁸ KY has its own exam regime (one week of study merits one point, as at universities in Sweden).

- Workplace training is critical and employers participate in designing courses.
- Every program has a steering committee.
- One-third of the program is unpaid workplace training.

Evaluations of KY indicate that approximately 60 per cent of ICT program participants were male. Six months after the program, 78 per cent of ICT graduates were employed (compared to a base average of 75 per cent), seven per cent were in a higher learning institution, and 13 per cent were unemployed. Of those employed, almost 95 per cent of KY graduates were working in the field they trained in. Among ICT graduates, approximately 60 per cent were working in companies with over 500 employees. Twenty per cent of ICT trainees felt the work-based training was too short, compared with nine per cent of participants in other KY programs. This points to the possible need for longer work-based training components for ICT programs vis-à-vis other vocational training programs. There are over 150 different KY arrangers and the program expanded from 1700 places in 1996, to over 12,000 spaces in 2000.

Overall, KY provides a good example of a medium-scale, market-based program designed to meet labour market needs. The work-based training component has been especially well received in the ICT sector where many firms require prospective employees to have work experience.

SwIT (Sweden Information Technology Vocational Training)

SwIT deserves special attention because it was a program created in response to the Swedish businesses that identified the need for qualified training personnel in the IT sector. In spite of a high rate of unemployment, employers were having difficulty recruiting personnel, especially those with expertise at a level between computer users and computer specialists. And this problem is shared by Sweden, Sri Lanka and Tanzania.

SwIT was a concept for meeting industry needs as well as those of the unemployed and employees in companies facing structural reform. SwIT coordinators claim that “rapid technological development, the information society and ‘the new economy’ create a permanent need for vocational training in information technology, both in the public and the private sectors” (Thun, 2002). Although the bursting of the “dot.com” and tech bubbles temporarily altered the labour market dynamic in this vibrant sector and there may not be a current shortage of ICT technicians in Sweden, 80 per cent of computer consultancies and computer service companies reported a shortage of personnel with sector-specific proficiency at the end of 2000. Moreover, nearly 60 per cent, mainly the computer consultancy companies, stated that access to a workforce constitutes the largest obstacle to expansion. Professions that require degrees, especially in electro-technology, computer science and telecom, are particularly short of workers but many technician level ICT workers are also in short supply (NIER, 2000). Industry experts in Sri Lanka and Tanzania point to similar needs (Samaranayake, 2002; and Ntiro, 2002).

SwIT actually addressed two quite different needs for ICT in the Swedish economy: the ICT sector needed more skilled technicians; and

traditional sectors and government need more people with ICT skills to improve efficiency and responsiveness. Indeed, non-ICT companies do not make enough use of the information technology and often have difficulty facing the challenges created by globalization and the new economy. The Federation of Swedish Industries, the Swedish IT Organization and the Swedish Government realized this problem and addressed it through SwIT, which benefited not only the ICT sector but also traditional sectors, public services and government.

SwIT had mechanisms to continually evaluate training institutions, which allowed them to spot problems very early. Further, SwIT coordinators developed very clear program descriptions and requirements beforehand, which helped training institutions develop appropriate training and placement programs. SwIT was structured as a non-profit organization with a mission to fill the gap between university computer engineers and ordinary users and the needs of the companies should drive the training programs. The core objectives were as follows:

- Train 10,000 unemployed individuals;
- 90 per cent would complete and pass training;
- 90 per cent of these would receive job offers ; and
- Recruited persons would be of use from their first day of employment (Thun, 2002).

SwIT was flexible and responsive with 50 local project leaders, the majority of whom were self-employed, and a small central secretariat for overall project management, accounting and controlling, marketing, procurement, communication and support. The SwIT website played an important role. Participants could apply online and training providers could access information on courses. SwIT training categories, participants and outcomes are highlighted in table 2.7.

Table 2.7 SwIT training categories (course starts per month)

	Procured places	Admitted participants	Job Offers	Participant percentage	Job offer percentage
User support/IT educator	1514	1418	1198	12%	84%
e-commerce	392	385	263	3%	68%
Internet/web developer	916	881	670	7%	76%
IT-Competence ¹⁹	1694	1769	1542	15%	87%
Multimedia	833	808	637	7%	79%
Special ²⁰	570	559	445	5%	80%
Superuser ²¹	858	821	729	7%	89%
Engineer	3463	3408	2730	29%	80%
Developer/Programr	2033	1901	1562	16%	82%
Total	12,273	11,950	9776	100%	82%

(SwIT, 2002:3)

¹⁹ IT salespersons, project managers, IT accountants, IT managers in companies, designers who use IT as a tool, telephone support, business developers, accounting assistants, etc.

²⁰ IT entrepreneurs.

²¹ SAP/R3, Movex, producers of teaching materials, project assistants, GIS-specialists, IT managers, etc.

SwIT measured participant satisfaction for over 15,500 courses on a scale of 1 (very unsatisfied) to 10 (very satisfied). The goal was to achieve a satisfaction index of at least “7” and 62 per cent of participants rated their satisfaction at “7” or higher. Moreover, only 11 per cent ranked their satisfaction to be lower than “4” on the index (SwIT, 2002:5).

Inputs and outputs

The Swedish government allocated SEK 970 million to SwIT and the initiative was implemented from a labour market perspective, in collaboration with AMS, the Federation of Swedish Industries and the association for SwIT. The agreement with SwIT originally aimed to train 10,000 individuals, 75 per cent of whom were unemployed, in 1998 and 1999. The agreement extended into 2000 and a total of 11,950 people participated in the program. *The costs of training an unemployed person, and matching them with a job, amounted to SEK 78,000, of which SEK 60,600 were pure training costs.* (SwIT, 2002). SwIT budget details are outlined in table 2.8 below.

Table 2.8 SwIT budget figures per participant (SEK)

	Budgeted cost	Actual cost	Per cent of budgeted cost
Local costs: Course costs	65,000	60,594	93%
Certifications	1,197	3,096	259%
Local admin.	11,111	9,707	87%
Total local costs	77,308	73,397	95%
Central costs	3,782	3,715	98%
Selection costs	1,389	879	63%
Total	82,479	77,992	95%

(SwIT, 2002:6)

Overall, SwIT was under budget despite registering more participants than expected. Approximately 90.5 per cent of participants completed their training and 90.3 per cent of completers received job offers with about 5,000 companies. Of 60,000 applicants, 40,000 were interviewed and tested almost 12,000 were chosen to participate in 112 vocational categories and 614 training courses.

To some extent, KY and especially the SwIT experiment, represent a transformation of education to adapt to society’s demand for a new form of training “The structural reform of companies and society requires greater knowledge people, companies and organizations need access to vocational training regardless geographical and time boundaries. Long life learning will now and in the future involve many more individuals in shorter or/and longer programs for vocational training” (Thun, 2002).

Evaluation

The office of Labour Market Policy Evaluation (IFAU) evaluated SwIT. One aim of the program was to have all unemployed persons passing a SwIT course employed within six months of the conclusion of the course. The program failed to reach this objective but SwIT training

courses have a higher proportion of persons in work than the regular ICT-related courses organized by AMS (62 per cent versus 49 per cent). Moreover, SwIT was able to facilitate employment for approximately 10,000 of the 11,700 trained IT specialists within a year of program completion. Two months after the termination of SwIT, 82 per cent of participants had received job offers (IFAU, 2002).²²

Unlike Kunskapslyftet, which focuses on the *individual* and their particular needs (and assumes that if the individual is educated, they can contribute to the market) programs such as SwIT come from the opposite side of the equation by responding to *industry* needs. SwIT was based on a classic labour supply policy – with a goal to solve a skills bottleneck in industry through labour market training (SwIT, 2002). This highlights a significant difference between education driven by the Ministry of Education and/or Skolverket and *labour market training*. AMS-funded training is often in response to labour supply bottlenecks and the education provided tends to focus on employer skills needs in contrast to the more individual-needs driven education through programs such as Kunskapslyftet. AMS training targets the unemployed, or those at risk of being unemployed, and the training tends to be vocational and geared towards increasing employability. Courses are procured from both public and private educational coordinators (Ministry of Industry, 2000:19). *Overall, SwIT showed that with clear direction and objectives, a virtual organization could serve a vast country using ICT and administer a relatively large-scale, quality program.*

Conclusions on ICT training in Sweden

Vocational training courses in ICT-related fields are equivalent to educational programs leading to professional qualifications that often demand some kind of higher education. Participants take part in elements that are part of conventional higher education programs, such as courses in programming. The impact on the supply of workers at higher education levels has been modest with, for example, 1300 persons per month on ICT-related courses organized by AMS in 2000. The proportion of women in these courses was only 27 per cent (Ministry of Industry, 2000:20). There is no consensus over whether or not courses organized by AMS meet employer needs for skills at higher education levels. Specially designed courses at institutions of higher education can be commissioned within the framework of the training programs for the unemployed. These courses come closer to the employers' personal requirements and aim to supplement existing skills (Ministry of Industry, 2000:20). In order to relieve the bottleneck at the IT specialist level, the initiatives of AMS and SwIT assume a close collaboration with the employer so that the requirements for skills can be met. In turn, the employer must have a strategy for continual skill development, so the employee does not fall behind.

Overall, Sweden's popular/liberal adult education could be an ideal model for ICT skills development in other countries, especially the broad efforts to build a broad-based knowledge society (Odero,

²² It is important to note that the data for the IFAU evaluation were based on 11,700 participants rather than the 11,950 who ultimately participated in SwIT.

2002). However, it is important to realise the different resources available to different countries. Sweden is a wealthy country and dedicates one of the highest proportions of GDP to education. By contrast, Sri Lanka is a middle-income developing country and Tanzania is one of the poorest countries in the world where even the provision of basic education for all is a challenge that has yet to be met. *Consequently, efforts to expand ICT training in Sri Lanka and Tanzania should be focused on meeting specific industry needs.* Moreover, support for the expansion of ICT training in these countries should be leveraged as much as possible with similar efforts supported by other bi-lateral donors and international agencies.

Summary

In the terms of reference, it was asked which elements of Kunskapslyftet can be emulated and exported to developing countries wishing to promote information and communications technology sector growth?

Sweden's experience with Kunskapslyftet provides the following lessons:

- Kunskapslyftet provides insight as a model for program implementation. The “central decentralized” approach and the active collaboration between social partners are the key lessons from the experience. As a model of implementation, Kunskapslyftet can be exported to countries such as Sri Lanka and Tanzania.
- Kunskapslyftet supports a classroom approach to learning, offering comprehensive, broad courses. There are also vocational programs focussed on specific skills training. However, programs offered through Kunskapslyftet are not entirely suitable for ICT industry needs because they do not provide enough specialist knowledge and do not have a work-study element to balance theoretical classroom-based learning with more practical work-based learning. ICT courses offered through Kunskapslyftet do provide vital, general proficiency in ICT and provide the “learning how to learn experience” (i.e., the education versus the skills). Consequently, it is a successful education policy, but not entirely appropriate for promoting sectoral growth.
- Kunskapslyftet focuses on individual needs and attempts to raise the educational levels of those with the lowest attainment levels in order to reduce inequalities. The goal is to raise education levels but one of the main benefits is increased self-confidence, which helps participants succeed in the job market. This supports broad approaches to increase ICT competence but it may be more appropriate for Sri Lanka and Tanzania to follow more urgent, targeted, focused efforts to address ICT skills bottlenecks.

However, a broader look at Sweden's experience with ICT training reveals some more relevant policy lessons for Sida partner countries wanting to spur ICT sector growth. In table 2.9 below the main characteristics of Kunskapslyftet, KY and SwIT are summarized.

Table 2.9 Summary of Kunskapslyftet, KY and SwIT, “snap-shot” of 1999

	Geared to the needs of...	Approximate number of FTEs ²³	Approximate annual budget	Approximate cost per FTE	Employment status
Kunskapslyftet	Individual	100,000	SEK 3 billion	SEK 30,000	Employed or unemployed
KY	Individual /Industry	12,000 (2000)	SEK 660 million	SEK 55,000	Employed or unemployed
SwIT	Industry/ individual	5,250	SEK 500 million	SEK 95,000	At least 75% unemployed

Conclusions

There is a need for better ICT training in both Sri Lanka and Tanzania. SwIT was designed to clear a labour supply bottleneck and program managers claim that their experience as well as “research have proven that the form of learning, where the learners both learn by them selves and meet in real life with the support of a trainer, tutor or mentor are significantly better ways of learning then the stand-alone model. Because of the above it is very important to train qualified ICT trainers as well as train tutors. It is therefore necessary to first develop a program to train people in developing countries to serve as ICT trainers but also tutors” (Thun, 2002). However, it must be noted that SwIT was developed for unemployed Swedes whereas programs for Sri Lanka and Tanzania might best be geared to the needs of recent high school or university graduates given limited resources and high unemployment and, especially, underemployment among young, education people in many developing countries.²⁴

When supporting efforts to improve human resources to facilitate ICT sector growth in Sri Lanka and Tanzania, *Sweden’s experience with KY and SwIT are probably most relevant.* These programs are both geared to *industry* needs and therefore more directing support sectoral growth. Because the KY model is both broader and also supports higher qualifications typically acquired after a training period of two years, *we conclude that the SwIT model is most appropriate for targeted intervention to support sectoral growth in Sida partner countries.* A SwIT-like program could exploit the knowledge gained in Sweden through its extensive efforts to create an IT nation and an “Information Society for all.”

²³ Full-time equivalent spaces based on a training period of approximately 40 weeks.

²⁴ Indeed, the Sri Lankan Ministry of Employment and Labour (2002) reports that 62 per cent of university graduates in the fields of Commerce, Arts, Social Science and Humanities are unemployed!

III. Sri Lanka

Introduction

This report documents the initiatives at all levels of education, both formal and non-formal, in the field of ICT in Sri Lanka. This survey was undertaken on behalf of Sida, whose goal is to aid Sri Lanka in developing human resources that can contribute to building a strong ICT sector.

Sri Lanka has a number of ICT educational policies and initiatives, both planned and implemented. Some are government initiatives that in part have been shaped by bilateral donors and international agencies. While the existence of these plans is a positive sign, Sri Lanka faces a number of challenging obstacles before any project can yield truly positive results. The bureaucratic, multi-level government structure makes for much self-interest and a huge lack of communication. Many initiatives are replicated in different ministries with little or no effective coordination.

While the aforementioned problems must be resolved internally, an international agency can create a positive sphere of influence by working with non-governmental organizations, effective government ministries and agencies, and public and private training institutions in specific areas. Most funding and program monitoring occurs in the public sector, but there are many unregulated private institutions of dubious quality.

Consequently, *there is an urgent need for an accreditation/standards body to ensure quality ICT training is provided.* There may also be a need for an awareness/educational campaign for parents wishing to send their children to “computer schools” to clarify what it means to have a career in ICT. *Another area where Sida could greatly help is in ICT teacher training.* Lack of qualified teachers is a major issue. Adult education is also an area that can benefit from Sida intervention. The majority of ICT programs target youth, leaving the adult education sector untouched. Targeting those over 25 years of age with ICT programs would be a welcome project.

Sri Lanka is a country where no matter how many foreign powers (in the past) and international agencies (now) leave their mark, the country and people will do things their way. Keeping this in mind makes it easier to contend with the challenges faced when working in Sri Lanka. Faced with poverty, government ineffectiveness and a war torn populous, international agencies and the country itself must acknowledge that ICT will not be a single solution Sri Lanka’s woes. ICT is only a small part of

an overall economic reconstruction process and policy reform. This report begins with a general description of Sri Lanka's political structure and economy in relation to ICT. It then focuses on the education system with an emphasis on existing ICT programs. It concludes with an outline of policy challenges and recommendations.

Sri Lanka in Perspective: Government

Sri Lanka's government structure is multi-layered and confusing. It consists of an executive branch, with an elected president, without parliamentary power, serving a six-year term. The two major parties in Sri Lanka are United National Party (UNP) and the Sri Lanka Freedom Party (SLFP). The legislative branch consists of a unicameral 225-member Parliament and the judicial branch consists of the Supreme Court, Court of Appeal, High Court and Subordinate Courts. The administrative structure consists of eight provinces, 25 districts and 300 regional councils.

In December of 2001, a new government consisting of President Chandrika Bandaranaike Kumaratunga and Prime Minister (PM) Ranil Wickremesinghe was formed. There are high hopes for the PM, who has a reputation for setting realistic, attainable goals. The President is from a long line of politicians and is frequently criticized for being more concerned about politics than policy.

Colombo has a highly politicised atmosphere, with power struggles being waged between the Prime Minister and President. During our stay in Colombo, various news articles told of imminent snap elections if the president did not comply with parliament's demands while editorials urged the president and prime minister to put aside their differences for the sake of the country. The President was not invited to the Asian Athletic championships, one of the biggest sports events in Asia. Squabbles aside, necessary reforms are being introduced and the peace process is going well with the Tamil rebels. While the government has been concentrating most of its efforts on the peace process, there have been many education, labour market and ICT initiatives. Goals of various policy papers include utilising ICT to make Sri Lanka politically and economically robust and taking ICT to every village, citizen and business. There is also a goal to transform government by using ICT and to create a new generation empowered with information technology. The majority of these policy initiatives have not been implemented, but they have been prioritised as priority areas. There is, however, frustration expressed by those who have seen several policies developed but not implemented due to inadequate funding and political blockages.

A significant obstacle to policy implementation is lack of funds. The government of

Sri Lanka has experienced severe revenue shortages for years and the treasury has been depleted by the war. The country has received about USD 500 million annually in grant aid in the past years with Japan being the biggest donor and Sri Lanka has also accumulated approximately USD 9 billion in short, medium and long term debt. Liabilities to the International Monetary Fund (IMF) increased by USD 48 million in 2001, due to the purchase of SDR 103 million under the Stand-By Agreement in April and repayments on account of loans under the

Structural Adjustment Facility (SAF). Total debt to GDP ratio is 54.7 per cent and if liability is included the debt to GDP ratio climbs to almost 62 per cent (Central Bank, 2001).

Another obstacle to policy implementation is the “bloated” government. Sri Lanka has 700,000 public servants (3.1 for every 100 citizens) – the highest ratio of public servants to citizens in all of Asia. There are 32 cabinet ministers, 21 ministers of non-cabinet rank and 11 deputy ministers, for a total of 64. Many ministries have staff with titles such as additional secretary or additional deputy, supposedly because the original had too much work to do. Some critical departments, however, appear to be understaffed such as Policy and Development, whose deputy minister is also the Minister of Science, Technology and Economic Reform.

In addition to overstaffing, there are also structural problems. For example, three different ministries handle matters of education, yet none cover adult education. Education policy is handled by the Ministry of Human Resources Development, Education and Cultural Affairs. Management of primary and secondary schools is undertaken by The Ministry of Education. The Ministry of Tertiary Education and Training (formerly called Ministry of Technical Education and Vocational training) oversees post secondary education and training. This ministry has six sub-departments: the Department of Technical Education and Training; the Vocational Training Authority of Sri Lanka; the National Apprenticeship and Industrial Training Authority; the National Institute of Technical Education of Sri Lanka; the Tertiary and Vocational Education Commission; and the University Grants Commission.

Further complicating the task of managing education at the primary and secondary levels are the multiple layers of organization. There are eight provincial education councils and 11 zonal education offices. Underneath them are the divisional education officers, then school inspectors. The eight provincial councils derive their power from the constitution and have their own parliament. They cannot change central ministry policy, but they have much leeway to interpret it. There have been clashes between the Ministry of Education and provincial councils. Consequently, the government has curtailed funds to provincial councils and, instead, now channels funds to five newly created development agencies with resulting clashes between the two entities. To change the current structure would require a change in the constitution.

Economic overview

Sri Lanka’s economy has been hampered for 20 years by the violent conflict between the government and the Liberation Tigers of Tamil Eelam (Tamil Tigers). The Tamil Tigers have controlled much of the north and northeast of the country and initiated actions in much of the rest of the country. However, a cease in hostilities held through 2002 and peace negotiations are progressing well in Thailand. A peaceful resolution to the conflict would provide a much-needed boost the country’s economy.

The Human Development Index ranks Sri Lanka as a medium human development country with relatively high life expectancy and literacy but a low GDP per capita. The human development indicators

summarised in table 3.1 highlight the challenges the country is facing and provides some contrast between Sri Lanka and other South Asian and medium human developed countries globally. Sri Lanka has steadily improved its human development index trends since 1970, an impressive accomplishment in a country wracked by civil war.

Table 3.1 Human development indicators

	Years	Sri Lanka	All developing countries	Medium Hu Dev countries	South Asia
Life expectancy at birth	2000	72.1	64.7	67.1	62.9
Adult literacy rate	2000	91.6	73.7	78.9	55.6
Combined primary, secondary and tertiary enrolment (% aged 6–23)	2000	70	61	67	53
GDP per capita (USD adjusted for PPP)	2000	3530	3783	4141	2404
Annual population growth rate (%)	1975–2000	1.3	1.9	1.7	2.1
	2000-15p	0.8	1.4	1.0	1.5
Urban population	1975	22.0	26.1	29.5	21.4
	2000	22.8	40.0	42.6	29.4
	2015p	29.9	48.5	50.9	35.0

(Sources: UNDP, 2002:152–168)

Despite its relatively strong HDI rank, especially on education and health indicators, Sri Lanka remains one of the most rural countries in the world with only 22.8 per cent of the population living in urban areas in 2000 (UNDP, 2002:163). Consequently, any efforts to reach the majority of Sri Lankans must incorporate a strategy to reach those in villages and rural areas.

The depressed economy

In recent years, Sri Lanka has enjoyed relatively strong economic growth but the situation deteriorated in 2001. Economic growth dropped from a peak of 7.3 per cent in the second quarter of 2000 to –3.7 per cent in the third quarter of 2001 (Central Bank, 2002). The country’s GDP contracted by 1.3 per cent in 2001, compared with a 6 per cent growth rate in 2000 and an average of 5 per cent growth in previous years. This negative growth can be attributed to both external and internal factors including the global economic slowdown, the rise of international terrorism in 2001, continued drought resulting in power shortages, prolonged civil war and internal terrorist attacks. Negative growth was coupled with increasing inflation and declining investment and savings. Inflation increased to 14.2 per cent in December 2001 from 6.2 percent in December 2000. There has also been a decline in investment due largely to the decline in private investment by 13.5 per cent, while government investment increased by a marginal 0.3 per cent.

In 2001, services comprised 54 per cent of the GDP, followed by agriculture at 20 per cent, manufacturing at 17 per cent, construction at

7 per cent and mining at 2 per cent. The large proportion devoted to services reflects the unwieldy government structure and social services but also those employed abroad and the communications sector, which were bright spots in the overall depressed economy. Foreign employment placements increased by 2000, from 181,000 to 183,000. *The number of fixed access telephones grew by 8 per cent, mobile telephones grew by 67 per cent and telephone density increased from 6.5 to 8.3 (number of mobile and fixed phones per 100 persons).*²⁵ *Internet subscribers rose to a 60,000.*

The agricultural sector is in decline and this is a serious challenge in a predominantly rural country like Sri Lanka. In 2001, the sector was adversely affected by drought and the output of tea, rubber, and coconut decreased. Industrial output also contracted, with notable declines in apparel, textiles, diamond processing and petroleum products. The industrial sector declined largely because of a sharp decline in export-oriented industries affected by the global economic slowdown (Central Bank, 2002). There was growth, however, in the areas of food, beverages and tobacco products as well as processed food, tea and meat products.

Using ICT to increase competitiveness

The government of Sri Lanka is pushing hard for ICT development and is working to attract foreign investment and aid for ICT sector development. Currently, ICT plays a relatively small role in Sri Lanka's economic profile, though the mobile telephone market is thriving. Indeed, there is advertising all over the country promoting mobile phone services.²⁶ There are also some competitive software firms participating in the global market. For example, OpenArc is a homegrown software development company with many global clients.

In 2000, the mobile phone market accounted for 37 per cent of the total telephone market, having grown at a compound growth rate of 57 per cent over the past four years (Greenberg, 2001:14). The number of fixed lines phones, however, remains quite low at approximately 600,000 and numerous shops advertise international and local call services. The number of public phone booths increased by 11 per cent to 9,100 between 2000 and 2001. In the fall of 2002, 15 per cent of Sri Lanka Telecom was privatized via an initial public offering (IPO). This is in addition to the 35 per cent stake Nippon Telegraph & Telephone Corporation has in the company. The IPO should generate much-needed funds, which could be used to expand the fixed-line network.

There is significant potential for increased economic activity if ICT were integrated into many sectors, including some of Sri Lanka's traditional industries. For example, at the opening of Sri Lanka's first CAD CAM (Computer Design and Manufacturing) centre for jewellery manufacturing at the Sri Lanka Gem and Jewellery institute, Minister of

²⁵ On the way to the hotel from the airport we met a taxi driver whose wife had moved to Cyprus to work as a maid. A large number of Sri Lankans work abroad, over 85 per cent of whom are women, many working as maids in countries such as Kuwait, Italy and Cyprus (Ministry of Employment and Labour, 2002). In this instance, the wife was on a three-year contract and while a financial boost to the family, the emotional costs were high.

²⁶ Advertisements for mobile phone services are very common in both Sri Lanka and Tanzania, reflecting both the explosive growth of mobile telecommunications and, perhaps more important, the latent demand for telecommunications in many developing countries. The ability to rapidly deploy mobile networks has fuelled this explosive growth but mobile communications remain costly and, to date, do not facilitate practical, low-cost internet access.

Tertiary Education and Training Kabeer Hashim, pointed out “if technology was introduced to the industry, Sri Lanka would have had a better turnover by way of exports. Last year Sri Lanka exported gems worth USD 2.5 million. If this amount had been exported after polishing, the estimated revenue would have been USD 150 million” (Minister of Tertiary Education and Training, 2002). Overall, 20 per cent of Sri Lanka’s exports are in the form of semi-processed exports and 80 per cent without any value-added. The gem trade provides a good example where the introduction of new technology could make the industry both more competitive and generate more employment in Sri Lanka.

Sida development cooperation in Sri Lanka

Sweden has been providing development assistance to Sri Lanka for almost 40 years. As with other partner countries, Sida’s work in Sri Lanka is guided by six goals developed by the government of Sweden: economic growth; economic and social equality; education for all; economic and political independence; democratic development, with support for improved management and higher efficiency at state agencies; environmental care; and gender equality (Sida, 2000). The main objective of Swedish development cooperation in Sri Lanka is to promote peace and democracy as well as economic development that benefits the poor.

Sweden has also stated that it will contribute to reconstruction and rehabilitation in the areas torn apart by the civil war when sustainable progress is made towards long-term peace. Details of Sweden’s development cooperation in Sri Lanka are provided in table 3.2.

Table 3.2 Sida development cooperation with Sri Lanka, 2001

Spending category	SEK
Human rights & democratic governance	29 222 802
Human rights	18 330 014
The legal system	321 122
Democracy	4 549 296
Public administration	2 734 503
Promotion of peace & conflict management	3 287 867
Social sectors	15 273 736
Health care	2 809 572
Education	7 901 807
Other	4 562 357
Infrastructure, private sector & urban development	122 848 608
Infrastructure & urban development	110 200 086
Private & financial sector	12 648 522
Natural resources	963 104
Other	20 380 356
Total	188 688 607

(Source: <http://www.sida.se/Sida/jsp/Crosslink.jsp?d=373&a=11997>)

Moves to leverage development cooperation are important and Sida is cooperating with other agencies to ensure better-coordinated and more effective support. Sida is also better coordinating its efforts as it moves from project-oriented support to sector-oriented support. *A unique role for Sida is to export Swedish policy lessons to developing countries, especially in the areas of education and labour market policy.*

Peace dividend could result in increased spending on education and ICT

Peace talks between the Sri Lankan government and Tamil Tiger rebels resulted in cease-fire that may allow for decreased defence spending and an increased emphasis on social programs. However, as with education, ICT has the potential to end up mired in departmental bureaucracies and jurisdictional battles if it does not fall under the appropriate ministry with sufficient clout. Several ministries currently handle ICT policy and there is no central coordination. The Ministry of Education has a national policy on IT in schools but the Council for Information Technology, the Chamber of Commerce and the Ministry of Economic Reform, Science and Technology are also involved with ICT. It is ironic that the World Bank, which cites how overcrowded the government bureaucracy is, authored a report on ICT recommending the appointment of a strategic council to advise the Prime Minister on ICT policy formulation, the creation of an ICT board, the creation of a Sri Lanka Technology Services agency, the appointment of five program managers to lead coordination of policies, as well as the creation of implementation units in each relevant ministry (World Bank, 2002). Ideally a strong ministry should coordinate all efforts, with a direct mandate from the Prime Minister. The creation of a new ministry is inadvisable because of the already crowded government. A logical home for ICT might be the Ministry of Policy Development and Implementation, under the Prime Minister.

Labour market overview

Sri Lanka's population is estimated to be 18.7 million. The most striking feature is that the population is aging and an increasing share of the population will be elderly in the years to come.²⁷ Aging will have an impact on labour supply as less young people enter the labour market. This underscores the need for attention to the adult cohort and adult skills development, so that those who are ageing now can contribute to the labour force for a longer period of time and, consequently, lessen the burden they create on health and pension resources. The percentage of the population aged 0–17 fell from 41.6 per cent of the population in 1981 to 32.9 per cent in 2001 while the percentage of those aged 18 and over increased from 58.4 per cent to 67.1 per cent of the total population. The proportion of those aged 65 or above in 2001 was 7.0 per cent, an increase from 5.4 per cent in 1981. Those aged 15–64 years (the primary labour force) accounted for 67.4 per cent of the population (Central Bank, 2002).

²⁷ Sri Lanka's most recent census was in 2001, with the previous census conducted in 1981. Due to internal conflict, a census was not taken in 1991. The 2001 census does not include new data from the northern and eastern province of Sri Lanka for the same reason.

Of the 6.7 million Sri Lankans in the workforce, 37 per cent work in agriculture, 16 per cent in services, 16 per cent in manufacturing, 13 per cent in tourism and hospitality, five per cent in construction, five per cent in transport, storage and communication, and eight per cent other (Ministry of Employment and Labour, 2002). There are approximately 2.3 million people working in agriculture, one million each in services and manufacturing and 800,000 in tourism. The share of private sector employment increased to 48 per cent in 2001, from 44 per cent in 2000. Public sector employment decreased marginally from 13.5 per cent in 2000 to 13 per cent in 2001 (Central Bank, 2001). Of those employed, 77 per cent have been unemployed for over a year. One-fifth of those in the Southern region and one-third of those in the western region are unemployed (Ministry of Employment and Labour, 2002). Central Bank estimates of employment by sector/activity differ and are outlined in table 3.3 below.

Table 3.3 Employment by economic activity, 2001

Sector Per cent of total employment (3rd Quarter, 2001)	
Agriculture	32.4 per cent
Industry	25.1 per cent
Mining and Quarrying	1.9 per cent
Manufacturing	17.5 per cent
Construction	5.6 per cent
Services	42.6 per cent
Trade and Hotels	11.9 per cent
Transport, Storage, Communication	6.5 per cent
Finance, Insurance, Real Estate	1.9 per cent
Personal Services, Other	22.2 per cent

(Central Bank, 2001:145).

Striking unemployment among youth and the educated

Unemployment in Sri Lanka was 7.8 per cent in 2001 but the unemployment exceeds 18 per cent among those aged 20 to 29 (Central Bank, 2001). Central Bank estimates of unemployment by age group are outlined in table 3.4.

Table 3.4 Unemployment by age group, 2001 (3rd quarter)

Period	Unemployment Rate by Age Group per cent				
	15-19	20-29	30-39	40-49	50 plus
2001 Q1	28.5	18.1	2.9	0.7	7.7
2001 Q3	32.7	18.0	3.0	1.0	7.8

(Source: Central Bank of Sri Lanka Annual Report, 2001)

Unemployment among educated youth is particularly problematic and indicates that the education system is not equipping graduates with the necessary skills to attain employment. Approximately 50 per cent of lower secondary graduates under 30 years of age are unemployed according to the Ministry of Labour and

Employment (2002). Again, Central Bank statistics differ, showing that 11.3 per cent of those who completed their O-levels are unemployed compared with 15.9 per cent of those who completed their “A”-levels or post secondary education. *Closer examination of unemployment among university graduates shows that those who studied commerce, arts, social sciences and humanities show the highest levels of unemployment. For those who studied the aforementioned areas, unemployment among males is 63.2 per cent and 61.1 per cent among females.* Therefore, Sri Lanka has a different dynamic from most advanced capitalist countries where unemployment generally *decreases* as education level *increases*. It may be that the old British tradition in Sri Lankan education is better suited to an advanced capitalist economy than a developing one. Data on unemployment by education are outlined in table 3.5 below.

Table 3.5 Unemployment rate by level of education, 2001 (1st and 3rd quarters)

Period	Educational Attainment			All
	Grade 5–9	GCE (O level)	GCE (A level)	
2001 Q1	6.9	11.1	15.3	7.7
2001 Q3	6.9	11.3	15.9	7.8

(Source: Central Bank of Sri Lanka Annual Report, 2001)

Ironically, the areas of studies that lead to the highest unemployment are the most popular. This popularity is the result of a traditional mindset, where it was thought that these areas of study would lead to secure, prestigious, government jobs. However, public sector job employment is on the decline, and may contract more in the years to come if the government decides to restructure.

There is clearly a mismatch “between the human resources needs of the private sector and the qualifications of the graduates produced by the state-run universities indicates the necessity of reforms in the university education system” (Central Bank, 2002). Curricula reforms are necessary at all types of educational institutions, both public and private. Unemployment rates by field of study at university are outlined in table 3.6.

Table 3.6 Percentage unemployed by area of study in university

Area of Study	Male	Female
Professional Science based faculties	10.2	13.9
Other Science Faculties	18.4	13.9
Law and Management	8.2	11.1
Commerce, Arts, Social Science and Humanities	63.2	61.1

(Source: Ministry of Employment and Labour, 2002).

In Sri Lanka, as in many countries, there are societal pressures and desire for upward mobility. Consequently, few people want to be a carpenter, plumber, or mason worker, yet these are sectors where unemployment figures are very low for those with proper training. For example, *unemployment rates among those with vocational training in the areas of plumbing, gem cutting and masonry are 0.8 per cent, 1.3 per cent and 3.9 per cent respectively.* This is in

contrast to those who have vocational training in computer and data entry operation, who suffer from 37.3 per cent unemployment. These latter statistics must be interpreted carefully, however, and it is reasonable to assume that the computer “training” given was not sufficient for higher level ICT jobs. Often training in IT means little more than learning business software packages – not really a career in IT.

A development that may have set Sri Lanka back decades, and also relates unemployment, was the policy decision to make Sinhala the national language in 1956. This decision led to the Tamil population being socially disenfranchised/excluded and unable to voice their complaints or fully participate in society – roots of the civil war. If this policy decision had not been made, English could have remained the common language but instead is only the language spoken by the upper classes and in particular job sectors. Anecdotally, the general consensus is that those who studied to their A-levels speak English well, which helps them find jobs. In areas such as Nuwara Eliya, where the British established their tea plantations, more English speaking Sri Lankans are found and are known to more readily find employment.

Poverty in Sri Lanka

Though the source material on poverty in Sri Lanka is somewhat outdated and many reports differ in the way they define poverty, a few conclusions can still be drawn. Depending on the report cited, anywhere from 15 per cent to 40 per cent of the population live in poverty. Seventy percent of the population earn less than LKR 5000 per month, estimated to be the amount needed to maintain basic living conditions. There is also great disparity in the country with the poorest ten per cent of the population earning an average monthly income of LKR 1,199 while the richest ten per cent enjoy monthly earnings of LKR 30,496 (Maddawaththa, 1999). Those who live in the north and east, where the civil war has had the most severe impact, are most likely to live in poverty. Moreover, 78 per cent of Sri Lankans live in rural areas but 85 per cent of poverty stricken households are located in rural areas. Despite these challenges, extent of poverty in Sri Lanka does not compare to some urban areas of India because the vast majority of people in Sri Lanka have homes. However, many challenges remain. According to a National Human Development report, access to safe drinking water is out of the reach for 28 per cent of the population in Sri Lanka, 24 per cent of the population does not have access to proper lavatories and sanitation, and 56 per cent do not have access to electricity (Maddawaththa, 1999).

There are people who would argue that the extent of poverty in Sri Lanka makes investment in the ICT sector misguided. However, social development will be hindered without the economic growth that ICT can stimulate in Sri Lanka. Indeed, ICT should be considered part of a comprehensive development program.

Skills profiles of the adult population

Sri Lanka has a relatively comprehensive school system in place but there are many points at which students “fall through the cracks” and do not reach higher levels of educational attainment. While school is compulsory, there is a 10 per cent rate of non-enrollment and UNICEF reports

that 45 percent of students leave schools after the General Certificate of Education (O-level or lower secondary). Only 25 percent of those who enrol in school complete the studies for A-levels, which is the minimum required to gain admittance to university. The University Grants Commission (UGC) under the Ministry of Tertiary Education and Training handles the selection process for students applying to university. While sources say that only two per cent of A-level graduates are admitted to university, the UGC officially reports that out of the 98,328 students satisfying minimum requirements for admission, 17.5 per cent or 12,760 were selected for the 2002/2003 school year. Of the students that did not continue on to university, 30 per cent were destined for unemployment, 28 per cent for some sort of employment, 16 per cent to private or other post secondary institutes, five per cent to “non-labour force areas,” and 1.5 per cent take public advanced technical courses. Pathways of A-level graduates are highlighted in table 3.7.

Table 3.7 Fate of those who do not continue on to university even though eligible

Fate	Percentage
Unemployment	30 per cent
Employment	28 per cent
University	17.5 per cent
Private Post-Secondary Institutes	9 per cent
Other Post-Secondary	7 per cent
Non-Labour Force Areas	5 per cent
Study Abroad	2 per cent
Public Advanced Technical Courses	1.5 per cent

(Source: University Grants Commission, 2002)

In 2000, approximately 500,000 students completed their O-levels and 200,000 completed their A-levels. Universities graduate about 9000 students per year, including about 2000 per year in science and engineering (Samaranayake, 2002). The OECD released a report in 1999 for world educational attainment levels. The statistics for Sri Lanka indicate that of adults aged 25–64, 33 per cent completed pre-primary and primary, 32 per cent completed lower secondary, 34 per cent completed upper secondary and two per cent completed post secondary schooling (OECD, 1999). These data are included in table 3.8.

Table 3.8 Population by highest level of education completed (%), 1999

	Pre-primary and primary education	Lower secondary education	Upper secondary Education	Tertiary-type A and advanced research
population aged 25 to 64 years	33	32	34	2
labour force aged 25 to 64 years	31	31	35	2

(Source: OECD, 1999).

One statistic prone to exaggeration in many countries is the literacy rate. In Sri Lanka it is estimated to be over 90 per cent but this estimate is based on an outdated definition of literacy based on number of years of schooling. The UN Human Development reports that the rate of *functional* literacy to be 50 per cent, which is still high compared to most developing countries, but leaves half the adult population without the necessary skills to participate fully in the economy.

At present, the supply of those studying in ICT-related fields at the university level is minimal, estimated to total only 255 students (0.5 per cent of the total pool of students). The majority of university students, approximately 32 per cent, are enrolled in the arts, humanities or social sciences. The second most field of studies are sciences followed by management and business studies and then medicine (University Grants Commission, 2002). Although Sri Lanka has a huge agricultural sector, only five per cent of students pursue studies in the field. Undergraduate enrolment by area of study is illustrated in table 3.9.

Table 3.9 Total undergraduate enrolment in conventional universities by major

Course	Students Enrolled	per cent
Arts	15,537	31.2
Management Studies and Business Studies	6,625	13.3
Commerce	4,236	8.5
Law	793	1.6
Science	8,661	17.4
Medicine	5,371	10.8
Dental	438	0.9
Veterinary Science	391	0.8
Agriculture	2,542	5.1
Engineering	4,578	9.2
Architecture, Quantity Survey and Design	399	0.8

As far as ICT is specifically concerned, in addition to the 255 students currently enrolled at university level courses of study, the present output of graduates from public universities who have included *some* computer science in their studies is roughly 670. This number includes those who attain a Masters of Science in Computer Science, a Bachelor's of Science in computer science, a Bachelor of Science in English with Computer Science, etc.

Currently, ICT programs are being expanded at the universities. For example, the University of Moratuwa is establishing a faculty of IT with an intake of 50. The university of Kelaniya is also admitting 50 students to a new course of study in management and IT and Samaranyake estimates by 2004 Sri Lankan universities will generate approximately 2000 university graduates with degrees in ICT and ICT-related fields (Samaranyake, 2001).

It is useful to consider the population of Sri Lanka in terms of their ICT skills and build on the three ICT proficiency levels in the report on: *general; specialist; and strategic*. We develop five different levels of ICT skills.

Levels 1 and 2 precede general proficiency. Those at Level 1 have no idea about IT and computers while level 2 implies an awareness of IT but no skills to use it. Level 3 is similar to *general* proficiency, where individuals have the ability to use business applications such as word processing, spreadsheets and e-mail. Level 4 is similar to *specialist* proficiency and includes ICT technicians and those with programming skills. Level 5 includes ICT professionals such as hardware and software engineers.

The vast majority of Sri Lanka's population is between levels 1 and 3, with the bulk of the population at levels 1 and 2. In Sri Lanka's villages, the first issue that must be addressed is awareness. NGOs such as Sarvodaya are working at raising awareness and introducing very basic ICT skills. Many public and private computer schools offer level 3 courses various software packages. There are also IT associations that have created certifications and diplomas at this level. The most well known exam is the Sri Lanka Computer Driving License, which has been taken by hundreds of people. A very small percentage of the population have level 4 and 5 skills.

Demand for ICT Skilled human resources.

At present, there is great demand for high level IT skills. Samaranayake writes "the rapid expansion of setting up software development centres in Sri Lanka by foreign developers with or without local partners, has created an immediate need for graduates with IT training and experience" (Samaranayake, 2001). If more foreign companies choose to locate their operations in Sri Lanka, a higher demand would be the result. There is also a very strong demand for ICT professionals as trainers and teachers, and qualified instructors for higher level programs. Greenberg writes, "Sri Lanka faces a serious shortage of experienced ICT professionals, senior people with 6–10 years experience in software design, project management, network design and management" (Greenberg, 2001). Teachers are also needed at lower levels. For example, many of those who currently teach various certificate or diploma level courses are said to have only one year of rudimentary training themselves.

Prior to supporting an advanced multimedia center, JICA (Japanese International Cooperation Agency) conducted a study on the needs of small and medium enterprises (SMEs) in the manufacturing, services and IT sectors in Sri Lanka. When asked about the kind of training necessary for the job, office applications were the top choice. Training on e-commerce, multimedia and hardware are identified as other important areas of training required (JICA, 2002). Multimedia and programming languages such as JAVA, VB and C++ were identified as applications and skills expected to be used on the job (JICA, 2002). The demand for people with experience in software packages such as Word and Excel has manifested into a misconception that knowledge of business applications ensures a successful IT career. Indeed, knowledge of business applications enables smooth and productive work and reinforces the need for level 3 training to be integrated into many fields – not necessarily delivered as stand-alone training.

One of the issues exacerbating demand of IT professionals in Sri Lanka is the allure of foreign salaries. Many Sri Lankan IT university graduates immediately move abroad for higher salaries. Therefore,

although the demand for programming skills is high in Sri Lanka, positions cannot be filled. For example, at Cintec simple Java programming is necessary to complete their website but it is virtually impossible to find a qualified person to do the job for the relatively low fee they are able to pay.

Future demand sources

Further demand for ICT workers could come from Sri Lankan companies, SMEs, foreign companies establishing operations in Sri Lanka or from government efforts to set up labour market/employment centres. In the national employment policy for Sri Lanka, the need for a national policy on SMEs was cited due to the significant role played by small businesses in creating jobs. The policy should identify the need for a business environment conducive to the development of SMEs (Ministry of Employment and Labour, 2002). The government should also continue its efforts to attract foreign investment as foreign companies could help counteract the diaspora of skilled ICT workers. The government is currently engaged in a major initiative to establish regional employment centres, which could support the creation of a database of unemployed graduates (Ministry of Employment and Labour, 2002). The goal is to achieve a system with some similarities to Sweden where the national labour market authority (*AMS*) has on-line information to help direct unemployed people to suitable training programs. The new employment centres in Sri Lanka could also serve as a vehicle to provide ICT training for school-age youth and unemployed persons. Sri Lanka has also been establishing career guidance centres at several universities to combat unemployment and reduce the mismatch between employer needs and skills.

Human resource development

When surveying the efforts Sri Lanka is undertaking to create a skilled ICT workforce, it becomes clear that most initiatives are taking place at Levels 3 and 5, and mostly targeting youth. Subsequent sections of this report highlight different activity going on at each level of education. Issues related to a lack of qualified teachers, accreditation and even fraud come up time and again.

The education system in Sri Lanka

Schooling was influenced by Portuguese and then Dutch colonial administrators before British colonial rule, which ran from 1796 to 1948 when Ceylon gained independence. During the early British colonial years two parallel education systems existed with a higher quality, English-speaking system for the British and wealthy Ceylonese. By 1901 only one-quarter of children were attending primary school and the Ceylonese literacy rate was only 22 per cent (Little, 1999:85). Compulsory education was introduced in the early twentieth century and the Free Education Act was passed in 1945. “The immediate consequence of the Free Education Act was that the well-to-do continued to send their children to good government and government-aided schools without paying fees, while the masses continued to receive free the poor quality education that had all along been free to them” (Little, 1999:91). Significant changes were

introduced in 1972 when “O” and “A” levels were replaced by two national certificates and later in the 1970s when a common first nine years was introduced including pre-vocational training for all. However, these reforms led to questions about the international compatibility of Sri Lanka’s certificates.

Early childhood and primary education

Pre-school is not regulated by government but there are early childhood development programs and many private pre-schools. Many schools fraudulently advertise a connection or association with Montessori and other highly regarded pre-schools.

In the government run school system, there are four types of schools. 1AB schools are those that have classes up to grade 13 with a General Certificate of Education for Advanced or A-level science. 1C schools have advanced level classes without the science stream. Type 2 schools have classes up to General Certificate of Education for Ordinary or O-levels. Type 3 are primary schools with grades 1–5. There are currently 9,887 schools with 4.1 million students attending. Some are considered national schools, while other are considered provincial schools. Overall, 5.9 per cent are type 1AB, 18.7 per cent are type 1C, 40.8 per cent are type 2, and 34.7 per cent are type 3 (Ministry of Education, 2001).

In general, there are more resources dedicated to national schools in urban areas than rural areas. Therefore, despite significant public funding for schools, disparities still exist between urban and rural schools (Fernando 1998). Resources are concentrated in the Western area of Sri Lanka, with the fewest teachers in the Northern and North Central Provinces. These areas also have a higher proportion of untrained teachers (Statistical Branch, Ministry of Education and Higher Education, 2001). There are serious disparities between schools, even within the same district in urban areas. Some prestigious schools are well-resourced and attract wealthy, high calibre students through admission tests while relatively deprived schools are, almost without exception, attended by students from lower socio-economic groups (Fernando, 1998).

There is immense pressure for parents to get their students into good schools, even at the primary level and there is tremendous pressure on government and school officials to admit children to the most prestigious and popular schools resulting in fraudulent acceptance. Theoretically, acceptance is based on location, but parents often “fake” an address in the vicinity of good schools (Samaranayake, 2002). Moreover, many wealthy parents send their children abroad for schooling or send their children to private- or international schools. While schools do teach English, many parents are concerned that those teaching English can barely speak it.

Despite many challenges in Sri Lanka’s education system completion rates are impressive at the primary school level, with 92 per cent of the children admitted to school at Grade 1 complete their schooling to Grade 6. About 4.5 per cent of the children drop out of the school system between Grades 1 and 9, the rate being lower among the girls (3.8 per cent) than boys (4.9 per cent). These drop out rates and the primary completion rates are very impressive relative to most developing countries (Fernando, 1998). World Bank staff are sceptical of these high

completion rates and, instead, suggest that 45 per cent of Sri Lankan children drop-out before completing grade six (Aturupane, 2002).

ICT in primary and junior secondary schools

According to the School Information Technology Education in Sri Lanka Government Schools Master Plan, at the primary level (1–5) and junior secondary level (6–9), IT will be integrated into the curriculum but not be introduced as a subject. Integration will occur starting in 2005 for lower secondary and 2006 for primary (Ministry of Education, 2001).

Secondary and upper secondary schools in Sri Lanka

School dropout rates increase significantly after O-levels. Between the time that students are waiting for results from O-levels and actually enter schools to continue education many dropouts occur. As mentioned previously, approximately 45 percent of students leave schools after the General Certificate of Education (Ordinary Level). Only 25 percent of those who have been originally enrolled at school complete the studies for the Advanced Certificate of Education (A Level). By age 16, only 30 per cent go onto study A-levels (Aturupane, 2002). Again, there is an immense amount of social pressure to achieve high exam marks to get into the best schools.

Many parents send their children to private computer schools that advertise global careers in software development while students wait for their O- and A- level grades. There are about 3000 of these schools and very few are members of the Association of Computer Training Organizations. Most only provide basic training in business applications in exchange for high tuition fees. Lalith Gamage, of the Sri Lanka Institute of Technology, says these computer schools are not industry oriented but do provide useful, basic level IT training. But since these courses are not standardised, parents and employers are confused (Gamage, 2002). Moreover, there are numerous diplomas, which do not meet industry needs and standards. Some private institutions offer a degree after only two months of training and it appears many institutions are training without conveying much knowledge. There are initiatives, however, designed to address this problem. The Tertiary and Vocational Education Commission (TVEC) is attempting to register these facilities, a very challenging task. For example, when TVEC staff see advertising for a new private ICT training institution, they send a letter requesting that the institution register with TVEC.

TVEC's main problem is that they don't have the resources to prosecute fraudulent institutions, even though they do have the legislative power. If an institution requests to be registered, TVEC sends a registration team to assess the institute's facilities and teachers. They do not check curriculum. It is important to note, however, that registration is not equivalent to accreditation. Indeed, TVEC acknowledges that they cannot hold institutions to minimum standards if the registration body barely has the resources to even register facilities. Despite these limitations, to date TVEC has actually accredited 15 institutions. Unfortunately, the Commission has not published or advertised its accredited list, nor has it conducted an awareness campaign to educate people on the issues of registration and accreditation.

Another approach to ensure training quality is to develop standardised tests. A prime example of this is the Sri Lanka Computer Driving Test (SLCDL), a qualification certified by NAITA (the National Apprenticeship and Industrial Training Authority) through a national examination process. Initially, it was very difficult to get anyone to take responsibility for governing the exams but NAITA was convinced to organize them and the Authority now generates a modest profit through the SLCDL exam process. SLCDL is rising in popularity, partly because of the quality assurance that comes with a standardised program.

ICT at secondary and upper secondary levels

At the upper secondary levels (grades 10 to 12), ICT will be integrated into curricula starting in 2004. For those in advanced grades (12 and 13), IT was introduced as a stand-alone course in 2002 in 1000 of 1715 schools. Although many secondary schools have computers, there are very few teachers able to instruct in ICTs, and computers often go unused.

There are many challenges training teachers with ICT skills but the problem is being addressed. *The number of teachers who are considered computer literate is estimated to be less than three per cent.* The World Bank is working with the government of Sri Lanka on two initiatives – one for 400 schools that involves training 6400 teachers so that they can utilise IT as a teaching tool. Another initiative, the Teacher Education and Teacher Deployment Project, is for teachers at the provincial level. Instructors at the CRCs have been trained to a satisfactory level. The Ministry of Education also reports that there are 60 IT trainers in “train the trainer” programs and they will spread ICT knowledge to more teachers throughout Sri Lanka.

Another obstacle is connectivity as many computers in schools are not connected to the internet. Maintenance of computers may also be difficult if contracted computer companies do not stick to agreements or if funding is insufficient to support software, network and hardware maintenance. Most seriously, a number of poor secondary schools do not have electricity, which means they will fall even further behind as other schools install computers. The World Bank is particularly concerned about the lack of electricity at many schools.

Computer Resource Centres (CRCs)

For those who have passed their O-levels and A-levels, Computer Resource Centres are an option for learning computer skills. There are 72 CRCs country-wide, each with 20 PCs connected to a dedicated server, with resources mainly provided by the Asian Development Bank (ADB). The CRCs typically provide training in business applications such as MS Office and introduction to programming to students during their vacation. Courses cost only LKR 500 and provide a good value alternative to expensive private courses.

Tertiary Education.

The first higher education institutes, affiliated with universities in India and Britain, were established in Sri Lanka in the late nineteenth century but the first independent university was not established until 1942 when

the University of Ceylon was founded. By the end of the 1970s access to higher education had improved markedly though there were tensions between Tamils who occupied a disproportionate share of science seats and the majority Sinhalese, concentrated in Arts programs. The Sinhalese claimed that Tamil A-level scores were inflated to gain admission to coveted science programs. In response, the government introduced a system that limited enrollment to a group's share of the total population. This issue, combined with the language issue, contributed to the radicalisation of the Tamil independence movement.

Broadly speaking, ICT is making significant inroads in the tertiary education sector, with many ICT programs underway and others being implemented. However, there is still a significant lack of teachers and output is very small. Again, this underscores the need to train ICT trainers in Sri Lanka.

ICT programs in Sri Lankan universities

All 13 universities in Sri Lanka offer some ICT content in programs, but many are merely small components within a Bachelor of Science degree. There is a department of Information Technology (equipped to admit 50 students annually) at the University of Moratuwa, created in addition to their existing department of Computer Science and Engineering. There are also newly created three-year general and four-year special degree programs in Management and IT offered by the University of Kelaniya. And the University of Colombo merged its department of computer science and Institute of Computer Technology to form the University of Colombo School of Computing (UCSC), with 50 academic staff and an annual intake of 120 students (www.ucsc.cmb.ac.lk). The University Grants Commission (www.ucg.ac.lk) indicates that ICT programs are also being introduced at the University of Jayewardenepura (four-year special degree program leading to a B.Sc. in Business Administration and Information systems); and the Trincomalee Campus of the Eastern University, which introduced three-year programs leading to a B.Sc. in Science management and B.Sc. Computer Science. Annual output of IT graduates is outlined in table 3.10.

Table 3.10 Annual output of graduates in IT and IT-related fields in Sri Lanka

Degree	Output
M.Sc in CS	80
PG Diploma in CS/IT	80
B.Sc special 4yr in CS	60
B.S. Eng 4yr with CS	50
B.Sc general with CS	400
Total	670

(Source: Samaranayake 2000).

There has been a significant demand for ICT-related courses noted in a Ministry of Tertiary Education survey. However, this demand is not terribly focused. Students want more courses on computer literacy courses, partly based on the assumption that simple computer literacy

courses will get them the jobs they aspire to. There is little concrete idea of what ICT is, or what a degree entails. The danger is that the Ministry of Tertiary Education will interpret the survey results to mean that students want software application courses and consequently create programs that lead to more people being unemployed. Students need more guidance to clarify their misconceptions and focus their needs towards industry demands, which typically require level 4 (ICT technician) and 5 (ICT professional) skills.

English in the universities

Even though English is a compulsory subject at the GCE (O-Level), English language instruction is often poor, even at the post secondary level. Some students do not get significant exposure to English until university, and then only if taking a science or IT program. Humanities and social sciences courses are offered in local languages at the university level and it has reached the point where universities could not teach arts and humanities in English, even if they wanted to, due to lack of English speaking teachers. The lack of English language skills is an especially significant barrier in ICT fields given the international nature, and language, of the work.

International donor projects

There are numerous tertiary education projects by international donor agencies. A major World Bank project involves enhancing the quality and relevance of undergraduate education and one facet evaluates the use of ICT in teaching and learning processes in different disciplines at tertiary education institutions. The plan is to assess available human resources across disciplines and prepare a comprehensive human resources development plan for ICT. The project also involves the upgrade of IT equipment and facilities in all universities. JICA is funding an Advanced Multimedia Center at the University of Colombo and construction is well underway.

The Bachelor of Information Technology external degree (www.bit.lk)

The BIT is administered by the University of Colombo School of Computing and leads to an external Bachelors Degree in Information Technology. The program produces qualified IT professionals in addition to traditional university output. More important, *the BIT gives those who could not enter university due to the severe competition a chance to work towards a degree. It also gives opportunities to non-graduates already working in IT to obtain formal qualifications in IT through self-study.* The BIT is three years long, with a certificate in IT given after successful completion of module examinations at the end of the first year, an advanced certificate awarded to those who successfully complete test modules after year two, and the BIT is given at the end of year three. The program is structured so that students can either opt for self-study or go to private schools offering teaching of the BIT curriculum. The curriculum is rigorous and comprehensive, with themes covering data structure and algorithms, fundamentals of software engineering, object oriented systems development, rapid application development, visual computing, project management, and software quality management, among other topics.

Unlike regular degree programs at Sri Lankan universities, the BIT is not free. A pre-registration fee and an annual fee are charged in addition to fees for each module examination and for syllabi. A project examination fee is also charged in the third year. Registration fees range between LKR 1000 and 2000 and test fees range between LKR 800 and 1000. Fees are reasonable compared to those charged for international accreditation programs but learning costs are high if students opt for private school teaching of the BIT syllabus. This is exacerbated by the fact that many private schools fail to provide adequate instruction.

The UCSC tries to hold private schools accountable by publishing student test results on the web. In this way, new students can make informed choices about which school to attend. It may be useful to spread this information beyond the web, to a more widespread medium such as print. Overall, only one school's students, the Royal Institute, consistently pass BIT exams. It must be noted, however, that BIT reporting depends on self-reporting by students and response rates are low. Pass rates for various schools and modules are illustrated in table 3.11 below.

Table 3.11 Pass rates of selected schools and modules in the BIT

Name of Institute	Mathematics for Computing (Year 1) % pass	Fundamentals of programming (Year 1) % pass
Academy of Business studies	67 per cent	83 per cent
Academy of Info and Com Technologies	38 per cent	62 per cent
American College of Higher Education	45 per cent	76 per cent
Aquinas College of Higher Studies	43 per cent	57 per cent
Aussie-Lanka IT Corporation	36 per cent	45 per cent
Bitech Lanka	29 per cent	56 per cent
British Business College	20 per cent	36 per cent
Cinec IT Colombo	36 per cent	54 per cent
Cinect IT Crow Island	47 per cent	40 per cent
DP Aides	33 per cent	40 per cent

The Open University

Given the extremely competitive process to enter university in Sri Lanka, many seek an alternative path for university studies. The Open University provides a traditional distance learning/correspondence model and efforts are being made to expand the number of students accommodated from the current 15,000 to 30–50,000. Courses are conducted on television and students go to main university campuses to take practical exams. In addition to the Open University, there are foreign universities that partner with local institutions to offer distance degrees. Originally, the Open University was intended for those employed and adults but because there was so much demand from the many students who could not enter traditional universities, policies were changed to allow recent secondary school graduates to also utilize the Open University. Many of these younger students want more contact and lectures and university campuses see an increasing number of Open University students, not just for laboratory work.

Other non-formal educational initiatives

There are some private institutions, such as the OpenArc Computer School which run half-day workshops for all ages. They target project managers, accountants, top and mid level managers and teach computerized project management, resource allocation management, etc. The Sri Lanka Foundation institute, in collaboration with Lanka Internet Services also runs half day seminars, but for business managers, teachers, students and individuals. This seminar is more an introduction to the internet, its history, how to get connected, how to use it, e-mail, and the web. It is more on the awareness level and fees are LKR 350, including snacks and tea.

Teacher training:

There are 17 national colleges of education offering a diploma after three years of study but they offer little or no ICT training. *However, there are also 84 Teacher Centres for continuing education and some of these could be used to convey ICT skills to teachers as part of regular teacher upgrading.* There is also a lack of qualified ICT trainers at the tertiary level but programs are underway. Many IT lecturers in Sri Lanka were trained by international consultants who created IT curricula for many universities in Sri Lanka. These lecturers, in turn, support and manage ICT classes and many are now given the opportunity for further study in Europe.

Vocational and technical training

Vocational and technical training comes under the jurisdiction of the Ministry of Technical Education and Vocational Training. The Ministry develops broad policy but implements policies through the following agencies: HRDC (Human Resources Development Committee); TVEC (Tertiary and Vocational Education Commission); DTET (Department of Technical Education and Training); NAITA (National Apprenticeship and Industrial Training Authority); VTA (Vocational Training Authority); and NITESL (National Institute of Technical Education of Sri Lanka).

TVEC is the regulatory and policy body for technical and vocational training and it has conducted surveys of sectors such as the garment, jewelry, printing, construction, rubber and plastics, and food and beverages industries in Sri Lanka. The most recent survey included ICT and was conducted in cooperation with industry to identify skills gaps and labour supply shortages by examining the skills required to fill available positions. Surveys are used to inform vocational education and training. Highlights from the IT survey include data on job categorisation and educational qualifications. Of 1496 employees surveyed in 89 public and private IT organizations, 40 per cent were data entry operators, 10 per cent were analyst programms and 8 per cent were programrs. Less than 25 per cent of IT staff working as analyst, programr, computer operator, computer applications assistants or data entry operator answered the question regarding their educational qualifications (UCSC, 2001).

TVEC also conducted a separate report outlining challenges facing existing computer training programs run by VTA, NAITA, and the National Youth Service Council (NYSC). Through all streams, teacher

training was raised as a problematic issue. In the majority of the 19 training centres surveyed, it was found that the responsibility of teaching all subjects and supervision of students fell to only one teacher (except in the case of English). Teachers could not develop expertise in any one area of IT as a result of covering all topics in the course. Moreover, 37 per cent of instructors earned their IT qualifications by following diploma level courses in private sector IT institutions and 53 per cent underwent diploma level training in the public sector IT training institutions (TVEC, 2001). The other 10 per cent gained partial qualifications of professional exams from the Australian or British Computer Societies. Diploma programs conducted by private institutions were usually eight months or less. Also, the majority of those who underwent training at public institutions like the National Institute of Business Management (NIBM) had not completed their final exams when the survey was conducted. The majority of these teachers had also not received any pedagogical training or skills upgrading training. None of them had industry experience other than industrial placement during the formal training period (TVEC 2000). Finally, while curricula exist, teachers generally only teach what they know.

The various institutions that fall under the Ministry and provide ICT-related programs are the Vocational Training Authority (VTA), NAITA, NYSC, DTET, and NITESL. A slew of different courses are offered including: PC Technology; Advanced Certificate in Computer Aided 3D Draughting; Basic Computer Applications; Computer Application Assistant; Computer Hardware; Certificate Course in Database Management, etc. These courses usually last six months full-time. The most basic classes are often free but certificate programs cost roughly LKR 6000 to 8000. There are some degree level courses, which last two to three years, such as the B.Sc. in Management Information Systems offered in collaboration with the National University of Ireland. This course costs LKR 100,000 per year.

Few opportunities for adults

While most courses cater to secondary school graduates in their late teens, vocational training institutes do offer some options for adults. Most courses require students to have completed lower secondary school and the age target is 16–25. Some courses allow a maximum age of 32. However, certificate courses in database management, PC-based applications, computer-aided draughting and national diploma in computer studies have an upper age limit of 50. There are also programs without an age limit such as the diplomas in computer system design, computer based information systems, database management and visual basic programming.

In addition to the above-mentioned courses, the Tertiary and Vocational Education Commission, in conjunction with the Asian Development Bank, is organizing a national certificate in Information Technology. The pilot ran from January to July 2002 at an automotive school visited as part of this research. Existing automotive programs require students to take ICT as a small module. The pilot facility is also used to offer 18 to 25 year olds a one-year certificate in ICT certificate.

Non-formal and informal education

While there is a separate department for non-formal education set up under the Ministry of Human Resources Development, Education and Cultural Affairs, there is no specific policy targeting adults. Most efforts are concentrated on youth, especially educating young people whose schooling was disrupted by the civil war. Because of this need, adults are, for the most part, ignored. The emphasis of these efforts is on formal schooling and giving a second chance to children who failed to make it through the education system. The focus is often on literacy programs and re-directing students back into formal educational structures.

The government's weak presence in informal and non-formal education has left a large gap to fill. NGOs such as the Sarvodaya movement take over where government leaves off. Sarvodaya takes a grass roots approach advocating self-help and takes an "integrated, holistic approach to development, peace and spiritual awakening" (Liyanake, 2002). It targets the poorest people in Sri Lanka and engages them to share voluntary work. Sarvodaya has 34 district centres and 345 divisional centres, and is present in over 10,000 villages. It advocates building social capital through family units and kinship relationships, something government policies fail to do. There is a five-stage process in empowering villages. The first stage involves organizing different groups such as young people, the elderly and women from a pioneer village with access to a good road or good temple. By the third stage, the village is expected to register with the government so they can use government funds and become legally empowered. The goal is to build capacity to make political decisions. By the fifth stage, the village should have its own bank and people with financial, entrepreneurial and management skills. The aim is then to link the village bank to district telecentres, Sarvodaya's mechanism for creating a short cut to community development.

Sarvodaya plans to implement telecentres at the district level to increase awareness and demonstrate the power of information. They do not, however, want to create a consumer demand for internet access that will drain cash from already poor villagers. Instead, Sarvodaya attempts to determine how each village will benefit. Telecentres will have computers connected to the internet, a scanner, telephone, printer, digital camera and video camera. Sarvodaya envisions selected youth from villages going to district telecentres and then bringing back information to their village. Youth are the "human interface" and can gather locally relevant information at the telecentre (e.g., relevant news for the village, up-to-date information on pesticides appropriate for local crops). This information can be very valuable as many smaller villages are 50 kilometres or more from telecentres and are often without telephone lines. Sarvodaya relies on donor support (e.g., from Japan, Norway and Switzerland) for about its funding but would like to become completely self-sufficient.

Supply-side analysis and policy recommendations

Policy recommendations to increase ICT skills in Sri Lanka are made regarding the supply of people at each skill level. As there is much activity at Levels 3 and 5, Sida may wish to concentrate its resources on the following issues:

- 1) an ICT *awareness* campaign targeting Levels 1 and 2;
- 2) *teacher training* at Level 3; and
- 3) *certification*, especially at the Level 4 programming level.

The approach could use existing institutions to conduct relevant training programs, develop programs through partnerships and adopt a grass-roots method.

Level 5: distance learning

Demand for ICT workers exceeds supply at all levels but most efforts are focused on increasing the supply of highly skilled (Level 5) professionals. Sri Lankan universities are working to increase their computer science degree programs and donors are investing in expanding the number of computer facilities at universities. *One under-utilized way to increase the number of ICT graduates is to expand the distance learning capacity in Sri Lanka. The potential to capitalize on Sweden's experience with distance learning is great.* Indeed, as this report was completed there was an emerging program where Sida would support development of a national e-learning centre at the University of Colombo School of Computing Centre (UCSC).

Another institution that merits attention is the Open University of Sri Lanka, which recently received substantial support from the international community to revitalize its mission and expand capacity. Sida can also build on its existing ICT education exchanges with Sri Lankan universities, but should take care to build incentives into the program so as not to add to the existing brain drain problem.

Sida support at Level 5

UCSC could support a national e-learning centre with a Swedish partner university that would work closely with, but not replace, the Advanced Digital Media Technology Centre supported by JICA, where a program to support web-based training technology is in progress. The emphasis of the first stage of the Sida project is focused on pedagogic issues and will plan, design and evaluate e-learning with a longer-term possibility to support delivery of programs. Sida's Department for Research Cooperation (SAREC) is also working to increase research capacity in partner countries and has 13 active projects with universities in Sri Lanka. Indeed, Sida's belief that access to computers and the internet are essential to modern higher education and research motivated the agency to develop its first substantial ICT program in Sri Lanka. To date, Sida/SAREC's ICT involvement in Sri Lanka has been concentrated on two projects: 1) enhancing internet connectivity at state-funded universities; and 2) supporting PhD training for eight Sri Lankan computer science faculty through a rotating program with Swedish universities.

The enhancement of internet connectivity has resulted in true high-speed (2 megabits per second) connections at eight target institutions in Sri Lanka. Sweden is also supporting several network engineers to upgrade and maintain the networks. The PhD exchange involves eight Sri Lankan PhD candidates hosted by IT-universitetet in Kista, Chalmers Institute of Technology in Gothenburg, Uppsala University and Halmstad University College (Greenberg ICT Services, 2002:3). Overall, the Swedish support has not only greatly improved the ICT

infrastructure at a number of Sri Lanka's leading universities, it will also greatly improve the human resources at several universities as faculty return with PhDs.

Sida's ICT country survey for Sri Lanka stresses the need for training and specialisation of human resources in all areas concerning IT and estimates a significant shortage of ICT-human resources (Greenberg, 2001). *Overall, one of the most important challenges in Sri Lanka is to supply the country with well-educated and trained IT personnel to meet the massive demand.* Present and former governments have encouraged IT support from Sweden, but any large-scale campaign would necessarily involve *smart IT distance solutions because of cost considerations.*

Level 4: Support National Certification

Sri Lanka can benefit from coordination and efforts to correct market failures at this level. It is here where private institutions are claiming to offer programming degrees and assured successful careers in ICT. *Quality assurance efforts can be made by supporting the implementation of a national certification and accreditation process.* A standard curriculum has been created by SLASI (Sri Lanka Association for Software Industry) in conjunction with the Institute of Computer Technology, but TVEC, the most natural body to oversee the certification process has been resistant. TVEC should be strongly encouraged to serve as such a body and should give up on their attempts to register and accredit the 3000 existing private institutions. The success of the Sri Lanka Computer Driving License (SLCDL) implemented by NAITA should be used as an argument to convince them of the potential benefits. *A national certification and accreditation process would also likely increase competition among private training institutes to meet standards in order to attract fee-paying students.* Such a process might be further strengthened by developing national qualifications, with a certification process, for several ICT occupations.

Level 3: Fraud Prevention

There is much activity going on at the general proficiency level, or Level 3. However, the quality of teaching is suspect and there are reports of many fraudulent private sector institutions. However, a National Certificate (SLCDL) has been introduced and a list of recommended training institutions exist (usually members of the Association of Computer Training Organizations – ACTOS) but much work remains to be done.

The general proficiency level is a tricky area because on the one hand, teaching office software packages is useful, but on the other, it does not necessarily lead to job placements. For this reason, it would be useful to conduct an awareness campaign to inform people of what to expect from such programs. This could be complimented by a campaign to create an awareness of the fraudulent institutions that promise great things but do not deliver. TVEC may wish to create a consumer protection agency so that Sri Lankans can redress their grievances. ACTOS already provides an example of a national standard and TVEC should do the same. It has the legislative power to prosecute fraudulent institutions but refrains from doing so because of lack of resources. Sida may wish to support expansion of these resources so

that ICT-training consumers can access information more easily on the quality of training at private institutes.

Holistic schemes

In addition to teaching ICT skills as a separate module, a more holistic approach should be considered (e.g., where ICT is taught as part of project management). People should not be simply be taught ICT skills, but should also be encouraged to think innovatively about ICT. In addition to teaching ICT as a distinct module at vocational schools, a more integrated approach may be useful. The Ministry of Tertiary and Vocational Training visualized a situation where ICT is used in technical vocational education (e.g., welding instructors could be trained on the availability of ICT-based training programs). Such approaches entail decentralized learning, where the same lesson is taught at different technical colleges at the same time, with information being distributed over servers (i.e., computer-aided learning). The lesson from the gem industry teaches us that students should be taught about the technical advancements in all industries as a result of the introduction of ICT. Moreover, new entrants to sectors should learn new technological methods in their field.

Levels 1 and 2: computer awareness/targeting adults

There are some computer literacy campaigns underway, such as the one-day workshops sponsored by the Sri Lanka Institute Foundation (SLIF), where Sida sponsors the democracy youth program. Sida could take the SLIF workshop one step further and support the implementation of an awareness campaign on what a career in ICT entails. Because of efforts underway at the secondary education level, Sri Lanka's young labour force theoretically will be computer literate by the time they graduate. However, while youth are essentially being taken care of by the government, adults are left out. Partnership with Sarvodaya should be considered to augment their efforts to educate adults in rural villages about ICT – in a way that is specifically useful to village development. At the university level, students are given incentive to do community service work in the remote areas to gain valuable job experience. Another way to open up opportunities for adults is to allow them access to the existing facilities for young students. Both universities and secondary schools tend to close their computer facilities after traditional school hours. Dr. Jiyatilake of the SLIF advocates staggered hours and has had success with this method in an unrelated project. *Sri Lanka could greatly increase access to ICT if school principals and university administrators allowed access to the CRCs outside school hours for adult learners.*

Teacher training and training the trainer

There is a shortage of ICT teachers at all levels in Sri Lanka, from primary school to vocational institutes to universities. While there are some teacher training programs already underway, more in depth training and more spaces in existing programs are needed. Facilities already exist for training at the vocational level. The teacher training colleges could also be used. One way to address the loss of potential teachers might be to bond them. That is, require them to teach at vocational institutes for a number of years in return for being trained.

ICT for government managers

To date, the government has not made much use of ICT in its everyday business. In July 2002, however, the Norwegian-funded Distance Education for Public Servants program was highlighted in the news. The project was established to upgrade the skills of public servants and increase their proficiency in information technology with the aim to stimulate thinking, change dated attitudes and adopt new methods to be more creative and in the end have a more dynamic public service. Improving the efficiency and responsiveness of Sri Lanka's public service is an important part of improving the country's economic competitiveness and growth.

General constraints

To date in Sri Lanka, there has been an overabundance of policy rhetoric without sufficient concrete follow-up. Every Ministry has developed a plan, with little or no cross-departmental communication. *Good governance is major challenge in Sri Lanka. Therefore, it may be more appropriate at this time to concentrate limited resources on NGOs where small investments might reach many of the poor rural people.* Another challenge is the lack of communication between the different bilateral donor agencies, international agencies, NGOs and government Ministries working to promote ICT in Sri Lanka. In short, their disparate efforts lack coherence and make the realization of truly broad, national initiatives difficult to achieve. There is a lack of transparency in donor policies and this has undesired consequences. There is also a need for better analysis of urban-rural disparities.

The promotion of ICT goes far beyond the simple installation of computer hardware. The education system is too focused on tests, rote learning and memorisation of facts, and has too many places where the students fall through the cracks. Further, there is actually no time in the school curriculum for students to learn computer skills, which is another reason why many computers are not utilised.

Conclusions

Sri Lanka is likely on the road to a lasting peace and economic recovery, though the road will be a long one. Bright points include government recognition of important issues and the cease-fire that has held for almost a year. *The fact that there is demand for high-level ICT workers means that a local ICT industry exists and could grow if the demand is filled.*

Recommendations

Given the difficulties with governance in Sri Lanka, it may be productive to work with existing NGOs in the country. One outstanding example is Sarvodaya, which has proven to be an effective mechanism to reach the rural population. Lower level ICT awareness and training (e.g., levels 2 and 3 on our scale) could be channeled through cost effective NGOs such as Sarvodaya.

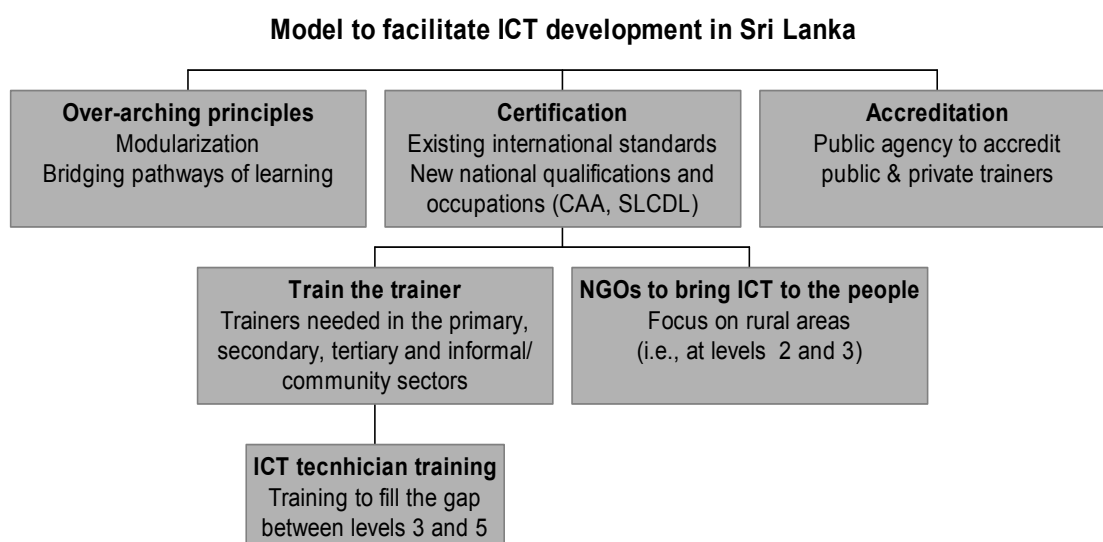
Access to ICT in Sri Lanka is quite good among those groups in the education system but non-existent for many rural residents. For example, many secondary schools in Sri Lanka have been equipped with ICT but are only open during school hours, and post secondary institutions have ICT but are only available for students. Private training institutions offer access to ICT but charge high fees and many are of dubious quality. The Ministry of Labour has opened a few new vocational guidance centres/

labour market offices with ICT but only in major centres. Therefore, *none of the existing public infrastructure provides access to, and training on, ICT for the millions of poor, rural residents.*

There are, however, several NGOs with a strong presence in rural regions and these could be used as vehicles to provide basic ICT training and provide access to computers. For example, Sarvodaya has eight district centres with rudimentary computer labs that provide ICT training that is relevant to local circumstances. Therefore, it may be appropriate for Sida to work with NGOs such as Sarvodaya to develop an ICT training capacity and affordable internet access outside major centres in Sri Lanka. *Moreover, unlike the World Bank strategy promoting ICT in education, Sida could focus on a community-based approach in cooperation with NGOs to build a capacity to deliver ICT services and training to rural areas.* Such a strategy could focus on strengthening democracy, improving access to ICT and supporting non-formal and informal learning and would supplement and compliment the World Bank's strategy to increase ICT usage in the formal education sector.

While Sweden and Sri Lanka appear to have little in common, they do share a strong commitment to education for all and high literacy rates. Indeed, Sri Lanka's basic literacy rate is estimated at 91 per cent. Ancient Sri Lankan society considered education a priority and this commitment to education and learning continues today (Samaranayake, 2002). The 2002 Human Development Index confirms Sri Lanka's relatively high literacy and education scores despite ranking only 89th out of 173 countries overall (UNDP, 2002:150). Therefore, Sri Lanka has good potential to capitalize on economic opportunities requiring superior human capital, especially if the necessary steps are taken to expand ICT education and training. Currently the demand to attend private ICT training centres is high, despite an abundance of low quality, high cost training provided by private training institutes. Overall, growth of the ICT economy in Sri Lanka is being hindered by many factors including a lack of qualified teachers, hardware, network connectivity and standards. *The most critical step in Sri Lanka right now might be to develop a national certification and credentialing agency.* A broad model facilitating ICT training in Sri Lanka is illustrated in figure 3.1.

Figure 3.1 Model to facilitate ICT training in Sri Lanka



IV. Tanzania

History

The first recorded contact with Tanzania occurred in the eighth century A.D. when Arab traders first arrived. In the ensuing centuries traders and immigrants came from as far away as Persia and India and built trading posts along the coast of present day Tanzania. The first European contact occurred when Portuguese navigator Vasco da Gama explored the East African coast in 1498. Within a few years the Portuguese claimed control over the entire coast but only created small outposts and did not colonise the region.

Zanzibar served as an Arab and Persian trading post for centuries before falling to the Portuguese in the 16th and 17th centuries. Arabs from Oman assumed control of Zanzibar in the early 18th century and oversaw the development of clove plantations and, more notably, the slave and ivory trade. Zanzibar became the centre of economic activity for a vast region and the Sultan of Oman even transferred his capital from Muscat to Zanzibar in 1840. Zanzibar exported spices to Asia, Europe and the Americas and the slave trade attracted much international attention with the British working to end the practice for over sixty years before it was finally curbed from Zanzibar in 1876.

European exploration of the interior of the mainland did not begin until the 1840s and the mainland was first colonised by Germans in the 1880s, though the German government did not assume control and administration of the territory until 1891. In 1890 the British made Zanzibar and Pemba into protectorates but Sultans ruled the islands until the late 1940s. The German colonial administration developed infrastructure in the new colony but there was resistance by the aboriginal people and this ultimately resulted in the Maji Maji rebellion of 1905–07. The rebellion temporarily united a number of southern tribes and cost over 100,000 lives. It can also be seen as the broad first manifestation of nationalism in Tanzania. German colonial rule ended after the First World War when the territory was transferred to the United Kingdom under a League of Nations mandate. Tanganyika became a UN trust territory under British control in the late 1940s.

Tanzania's modern political development started in 1954 when Julius Nyerere, a teacher and one of only two Tanganyikans educated abroad at university, organized the Tanganyika African National Union. The

party's candidates won the elections of 1958 and 1959 and soon after the Britain agreed to the establishment of internal self-government. In 1961 Tanganyika achieved autonomy and, later that year, independence with Nyerere elected as President. Political parties were first formed on Zanzibar in 1956, representing Arab and African interests respectively, and fought elections in 1957 and 1961. The United Republic of Tanzania was created when the newly independent countries of Tanganyika and Zanzibar merged in 1964.

Country overview

Tanzania has a population of approximately 35 million people and life expectancy is estimated to be between 45 and 51.1 years (World Bank, 2002; and UNDP, 2002, respectively). Tanzania ranked 151 out of 173 countries in the 2002 Human Development Index, largely because of the poor state of its economy. On the other hand, the country ranks relatively well in education with, for example, one of the higher literacy rates among the least developed countries (UNDP, 2002:52). Literacy, as measured by the percentage of the population aged 15 and over that can read and write Kiswahili (Swahili), English or Arabic is estimated at 75 per cent, with the rate for men estimated to be 85 per cent versus only 67 per cent of the country's women (UNDP, 2002:152).

Tanzania has been spared the internal strife that has plagued many African countries but it remains one of the poorest countries in the world, heavily reliant on foreign aid. The economy is mainly centred on agriculture, which accounts for half of GDP, generates 85 per cent of exports, and employs 80 per cent of the work force. Topography and climatic conditions, however, limit cultivated crops to only 4 per cent of the land area. Industry is mainly limited to processing agricultural products and light consumer goods.

In recent years the government has embraced economic reform including fiscal and monetary discipline, which has greatly reduced structural deficits. Although governance in Tanzania remains quite centralized, there have been moves to devolve more power to the 25 administrative regions: Arusha, Dar es Salaam, Dodoma, Iringa, Kagera, Kigoma, Kilimanjaro, Lindi, Mara, Mbeya, Morogoro, Mtwara, Mwanza, Pemba North, Pemba South, Pwani, Rukwa, Ruvuma, Shinyanga, Singida, Tabora, Tanga, Zanzibar Central/South, Zanzibar North and Zanzibar Urban/West.

The World Bank, the International Monetary Fund, and bilateral donors have provided funds to rehabilitate Tanzania's deteriorated economic infrastructure. Growth improved in the 1990s and featured an increase in industrial production and a substantial increase in output of minerals, led by gold. Natural gas exploration in the Rufiji Delta is active and production could start in 2003. Recent banking reforms have also helped increase private sector growth and investment. Continued donor support and solid macroeconomic policies should allow Tanzania to achieve real GDP growth of almost six per cent in 2001 and in 2002 (World Bank, 2002).

Economic overview

Many African economies are in crisis and 30 of the 30 poorest countries in

the world, with a per capita annual income of less than USD 380, are in Africa. The continent also has the lowest average life expectancy estimated to be 52 years compared with a global average of 67 years and 77 years in high-income countries (CIDA, 1998). In 2002 the United Nations Conference on Trade and Development (UNCTAD) found that poverty is pervasive in much of Africa with Tanzania among the poorest of countries with almost eighty per cent of Tanzanians living on less than USD 1 per day. UNCTAD concludes that amid such deep poverty, development assistance in least developed countries (LDCs) should aim to increase overall economic growth, rather than concentrating only on the poorest people (UNCTAD, 2002). *It is felt that spurring economic growth will have positive “spin-off” effects for the entire country.* This is a key point informing this research – it is not necessary to focus development assistance on the poorest of the poor in order to achieve maximum benefit for the economy and, ultimately, people most in need of the benefit of economic growth.

Essentially, Tanzania is one of the weaker LDCs, a group of 49 countries identified as “least developed” in terms of their low GDP per capita, weak human assets and high degree of economic vulnerability. *The Least Developed Countries Report* shows that the incidence of extreme poverty is highest in those LDCs dependent on commodity exports. However, *a central message of the report is that there is a major, but underestimated, opportunity for rapid reduction in extreme poverty in LDCs through sustained economic growth (UNCTAD, 2002).* This supports Sida’s approach to foster economic growth through ICT sector development.

The fact is, however, that Tanzania has a very weak economy. The 2002 Human Development Index reported that Tanzania’s GDP per capita, even after adjusting for purchasing power parity (PPP), was USD 523 per capita – second last out of 173 countries in the survey, ahead of only Sierra Leone (UNDP, 2002). The country’s unadjusted GDP per capita is only USD 210 per capita in current dollars, among the very lowest in the world (OECD, 2002:115). Foreign debt exceeds 80 per cent of GDP making Tanzania one of the Heavily Indebted Poor Countries eligible for debt relief. It is estimated that development assistance contributes at least USD 30 per capita. Clearly the country needs to generate more economic activity in order to make further social progress.

On the bright side, there are signs of economic recovery after decades of stagnation, both throughout Africa and in Tanzania, though many countries on the continent are still suffering the consequences of past policies and from violent conflicts. Although most countries in Africa have suffered from economic decline, economic performance and future prospects vary considerably. Tanzania is adjusting after its well-intentioned, but economically disastrous, experience with African socialism between 1967 and 1984.²⁸ This approach was championed by Julius Nyerere, who served as president from independence until 1985 when power was transferred to President Mwinyi until 1995. Despite good intentions, as articulated in Arusha Declaration of 1967, the economy collapsed in the 1970s due to a number of factors including the OPEC crisis, the drop in coffee prices, the war with Uganda and, especially,

²⁸ The African socialism of brotherhood (Ujamaa) and Self Reliance was based on respect for human dignity, sharing of resources, work by everyone and exploitation by none and was articulated in the Arusha Declaration in 1967. The declaration

inefficient central planning and corruption. By the end of the 1970s, Tanzania was one of the poorest countries in the world and it became clear that drastic reforms were necessary.

Tanzania's economic decline in the 1970s and 1980s contrasts with positive developments in recent years. Moreover, the early successes of almost universal primary education have fostered relatively high literacy rates though low school enrolment rates are pushing literacy levels down. Indeed, adult literacy peaked at a level over 80 per cent in the late 1980s and has generally been declining since then.²⁹ School attendance has been declining steadily for over two decades and the secondary school enrolment rate of seven per cent is the lowest in sub-Saharan Africa (OECD, 2002:119). Overall, however, most indicators point to the urgency of improving Tanzania's education system but this will require economic growth and good governance.

The human development indicators summarized in table 4.1 highlight the challenges the country is facing and provides some contrast between Tanzania and other sub-Saharan and least developed countries globally. Amid progress there are worrying signs, including low life expectancy, largely because of the rapid spread of HIV/Aids in the country. Literacy rates also declined from their peak in the late 1980s, likely a consequence of declining school enrolment, which is, itself, a consequence of inadequate resources for education because of poor economic conditions and insufficient government revenue.

Table 4.1 Human development indicators

	Years	Tanzania	All developing countries	LDC average	Sub-Saharan Africa
Life expectancy at birth	1970	45.3	54.5	43.4	44.1
	1981	52.0	—	50.0	—
	1997	47.9	64.4	51.7	48.9
	2000	51.1*	64.7	51.9	48.7
Adult literacy rate	1970	37.1	47.8	29.7	—
	1980	79.0	—	40.0	—
	1997	71.6	71.4	50.7	58.5
	2000	75.1	73.7	52.8	61.5
Combined primary, secondary and tertiary enrolment (% aged 6–23)	1980	44	46.5	31.6	—
	1997	33	59	37.0	44
	2000	32	61	38	42
GDP per capita (USD adjusted for PPP)	1960	272	915	562	—
	1997	580	3240	992	1534
	2000	523	3783	1216	1690
Infant mortality (per 1000 live births)	1970	129	111	149	137
	1980	101	—	124	—
	1997	92	64	104	105
Urban population	1975	10.1	26.1	14.6	20.9
	2000	32.3	40.0	25.7	33.9
	2015p	46.2	48.5	34.5	42.7

* The World Bank estimates Tanzania's life expectancy to be only 45 (World Bank, 2002)

(Sources: UNDP, 2002:152–168; OECD, 2002:118; World Bank, 2002)

²⁹ The most recent data indicate a slight rebound in literacy rates from 71.6 per cent in 1997 to 75.1 per cent in 2000 (UNDP, 2002).

Sida development cooperation in Tanzania

As noted above, development assistance accounts for approximately ten per cent of the country's GDP. Sida is one of the leading development agencies in Tanzania, with education assistance and cooperation accounting for the largest share of Sida's expenditures in the country.

Sweden has a long history of development cooperation with Tanzania, dating before the independence of Tanganyika in 1961. At the broadest level, the Government of Sweden has established six goals that guide Sida's work.

1. *Economic growth*, with support of ICT playing a major role.
2. *Economic and social equality*, focussed on health care and education for all.
3. *Economic and political independence*, including support for the Tanzania Revenue Authority.
4. *Democratic development*, with support for improved management and higher efficiency at state agencies.
5. *Environmental care*, contributing to the sustainable use of natural resources and protection of the environment.
6. *Gender equality*, which is considered in all Sida development cooperation with Tanzania (Sida, 2000).

These overarching goals are reflected in Sida's disbursements in Tanzania in 2001, outlined in table 4.2 below.

Table 4.2 Sida development cooperation with Tanzania, 2001

Spending category	SEK
Human rights & democratic governance	53 323 716
Human rights	14 778 545
The legal system	116 260
Democracy	16 021 923
Public administration	22 406 988
Social sectors	146 399 538
Health care	15 164 545
Education	119 983 816
Other	11 251 176
Infrastructure, private sector & urban development	120 361 100
Infrastructure & urban development	98 738 697
Private & financial sector	21 623 080
Other	—678
Natural resources	70 365 677
Natural resources	70 360 670
Pollution & other environmental protection	5 007
Other	97 778 294
Total	488 228 324

(Source: <http://www.sida.se/Sida/jsp/Crosslink.jsp?d=294&a=11986>)

Despite Sida's significant contribution to Tanzania, moves to leverage development cooperation are important and the agency is cooperating with other donor agencies to ensure better-coordinated and more effective support. Sida is also moving to better coordinate its efforts as it moves from project-oriented to sector-oriented support.³⁰ At the same time, Sida has a unique role to play in exporting Swedish successes, especially in the areas of education and labour market policy, to developing countries.

Tanzania's national visions

It is important to consider the three national visions Tanzania went through in the latter half of the 20th century: the vision to achieve independence; the Arusha Declaration which articulated a philosophy of socio-economic liberation based on socialism and self-reliance; and Vision 2025 to reconcile Arusha with economic reality. Arusha and 2025 deserve special attention because of the significant impact they had on Tanzania's social, economic and political fabric. Arusha was formulated in 1967, was embraced by most Tanzanians and guided the country's policies for social and economic transformation until the 1990s at which point it was felt it did not sufficiently address the market economy and incentive structures necessary to drive development. The strategy was too reliant on state-control of the means of production, exchange and distribution and on the public sector and state investment as the engines of economic development. Despite these shortcomings, Arusha fostered a set of fundamental moral, spiritual, ethical and civil values. Moreover, Tanzania enjoys national unity, social cohesion, peace and stability largely as a result of the core social values articulated in the Arusha Declaration.

Visions and the economy

Unlike many African countries where natural resource wealth contrasts with actual impoverishment, post-independence Tanzania had few exportable minerals and a primitive agricultural system. To counter this, Julius Nyerere's Arusha Declaration called for self-reliance through the creation of cooperative farm villages and the nationalization of factories, plantations, banks and private companies. Sadly, the Tanzanian economy was unable to support the state infrastructure required to achieve the social welfare goals outlined in Arusha. By the late 1970s it was clear that Arusha was an economic disaster, despite financial and technical aid from the World Bank and bilateral donor countries. Inefficiency, corruption, rural resistance and the rise in the price of oil all contributed to the country's woes, which were further compounded by the costly military intervention to overthrow President Idi Amin of Uganda.

In the late 1970s the economy essentially collapsed and Tanzania sought assistance from agencies such as International Monetary Fund (IMF). Initially it was felt that the IMF's recommendations would jeopardize the social progress achieved since independence. Consequently, Tanzania resisted implementing the reforms suggested by the IMF and

³⁰ Agneta Lind and Christine McNab outline the policies and practices of Sida regarding sector program support and sector-wide approaches to education in "Rethinking educational aid, sector-wide approach to education: views from Sida" (Lind and

instead, tried to implement a made-in-Tanzania stabilization and adjustment program respecting the nation's political and social goals. Attempts to reform the economy in the early 1980s failed and the country experienced a severe economic crisis with widespread shortages of many imported goods and a breakdown of the internal market system. The education system also deteriorated, with significant decreases in enrolment and literacy.

President Nyerere's resigned in 1985 and his successor, Ali Hassan Mwinyi, attempted to raise productivity and attract foreign investment and loans by dismantling government control of the economy. The change in power opened the door for the IMF reforms designed to address help Tanzania meet the challenge of the increasingly competitive nature of the global economy, reductions in development assistance and the general decline of African economies. The dire situation forced the government of Tanzania to implement several far-reaching economic reforms advocated by the IMF in the 1986 budget. The Economic Recovery Program was intended to:

- *Control inflation;*
- *Restore fiscal balance* by reducing government expenditures and raising taxes;
- *Eliminate current account deficits* by stabilizing exchange rates and promoting exports; and
- *Initiate a restructuring of government institutions* (CIDA, 1998).

The introduction of the recovery reforms was followed by an increase in economic growth, with GDP increasing by an average of four per cent per annum over the next decade. Overall, however, progress was uneven and the Tanzanian government was unable to realize key reforms in the early 1990s because of difficulties in the public sector with financial mismanagement; corruption; accountability; an inefficient legal system; erosion of meritocracy; tax evasion; and unnecessary bureaucratic procedures. Consequently, the IMF did not proceed with further Enhanced Structural Adjustment Facility (ESAF) credits and many bilateral assistance programs were cancelled. In 1995 Benjamin Mkapa was elected president³¹ and accelerated the reform process, resulting in better relations with many international agencies and bilateral donors.

Good governance

A multi-party system was introduced in 1992 and the ruling CCM (Chama Cha Mapinduzi – Revolutionary Party of Tanzania) handily won the elections in 1995 and 2000. When President Benjamin Mkapa³² was elected in 1995 good governance was made a priority in recognition of the role the state plays in promoting socioeconomic development. To support this the government implemented the following measures:

- Minister responsible for Good Governance and Prevention of Corruption Bureau;
- Tanzania Revenue Authority to administer revenue collection;

³¹ The one-party system came to an end in 1995 with the return of multi-party, democratic elections. The elections were especially contentious in semi-autonomous Zanzibar and Pemba where the popular opposition pointed to voting irregularities and election violence had occurred.

³² Mkapa was elected as an anti-corruption crusader and it remains a main theme of his regime despite allegations against some

- Parastatal Sector Reform Program to manage the privatization process;
- Civil Service Reform Commission to restructure government;
- Human Rights Commission and a Judiciary Reform Program;
- Integrated Financial Management System and regional sub-treasuries to improve budget management; and
- Ministry responsible for regional administration and local government.

The government has improved government-business relations and enacted a law establishing a free trade union movement. The National Framework on Good Governance has been implemented by key players in Tanzania including the central government; local government; civil society; private sector; and partners in development. The objective of the framework is to facilitate improved coordination of the various governance reforms and to identify specific areas for a targeted approach in supporting governance initiatives. Focus areas include popular participation in decision making; regulatory framework; constitutionalism, rule of law, administration of justice and human rights; gender equity and equality; accountability, transparency and integrity of public affairs; electoral democracy; and public service.

Since the 1995 elections, Tanzania has increased the pace of necessary reforms. There is a campaign against corruption and fiscal and monetary targets are taken seriously. The government is also privatizing many parastatal corporations and decentralizing many programs to the district level. These steps have motivated donors to release frozen bilateral assistance. Moreover, the IMF has released additional ESAF credits and the World Bank is supporting new programs. The government's commitment to macro-economic stability and sound management practices has yielded positive results, especially in the following areas.

1. Price and market reform, with most price controls abolished (except for petroleum and electricity costs) and input subsidies phased out.
2. Exchange rate reform, with a series of devaluations resulting in a competitive exchange rate, and the abolition of exchange rate controls.
3. Trade and industrial policy reform allowing the importation of funds, replacement of import restrictions and rationalization of tariff and the sales tax systems.
4. Export incentives, with the removal of many impediments to trade (e.g., licensing and registration requirements for exports, some export permits etc.).
5. Financial sector reform, permitting private banking.
6. Monetary policy reform, with treasury bill auctions and lower interest rates.
7. Parastatal reform to introduce greater competition, liquidate uneconomic units and divest others. Since 1993, over 100 parastatals have been privatized or liquidated.
8. Reform of public administration, with a reduction in the civil service from 360,000 in 1993 to 264,000 in 2000 (CIDA, 1998 and Embassy of Sweden, 2000).

Tanzania's Vision 2025

Just as the Arusha Declaration provided Tanzania with a view around which to mobilize in 1967, Vision 2025 guides the country's development today – a period characterised by competition and dominated by those with advanced technological capacity, high productivity, modern and efficient transport and communication infrastructure and, above all, highly skilled workers. In order for Tanzania to compete it must find ways of improving these areas.

The government of Tanzania solicited the views of a wide cross-section of society when formulating the new vision to guide economic and social development efforts to 2025. In a sense Vision 2025 is a recognition that Arusha failed in the face of global capitalism. The need to formulate a new economic and social development vision for Tanzania emanated after the initiation of economic reforms in 1986 when the government realised that earlier policies were not fostering economic growth and technological development. Structural adjustment programs have been followed for 16 years the nation lacks a philosophy for long-term development and Vision 2025 is intended to fill this void (United Republic of Tanzania, 1996).

A major goal of Vision 2025 is to reduce abject poverty and move Tanzania from a least developed country to a middle-income one by 2025. The economy needs to transform from a low productivity agricultural economy to a semi-industrialized one led by modernized, productive agricultural activities complemented by industrial and service activities in the rural and urban areas. Consistent with this vision, Tanzania of 2025 should be a nation imbued with five main attributes.

1. *High quality livelihood* with universal primary education; high rates of literacy and tertiary education & training; primary health care for all; lower infant and maternal mortality; higher life expectancy; and the absence of abject poverty.
2. *Peace, stability and unity*.
3. *Good governance* (accountable, rewards good performance and curbs corruption).
4. *An educated, learning society* that competes regionally and globally.
5. *A competitive, diversified, semi-industrialized economy* capable of sustainable growth; shared benefits; economic stability; annual growth of eight per cent or more; and an adequate level of physical infrastructure (United Republic of Tanzania, 1996).

This report addresses the development of ICT skills as a means to facilitate economic development but this is just one part of a larger battle for political and economic progress in Tanzania. Achieving the goals of 2025 will allow Tanzania to become a competitive player in regional and world markets, with the capacity to promote national interests and adjust quickly to market shifts. There are, however, obstacles to achieving the Vision including a donor dependency syndrome; a dependent and defeatist developmental mindset that has not supported accountability, hard work, ingenuity and creativity; a low capacity for economic management with excessive use of administrative controls and regulations; low productivity in all sectors; poor governance and organization of production; and ineffective implementation syndrome (too many plans without effective implementation). This has contributed to an erosion of trust and the onset of apathy.

Driving forces

Tanzania should capitalize on its high degree of national unity, social cohesion, peace and stability. These qualities give Tanzania an advantage over every other country in the region but they have been in decline and Tanzanians must adapt to competitive pressures that have changed dramatically since Arusha. These demand new forces capable of driving Tanzania from an LDC country to one with a high level of human development. In this context, three key driving forces need to be promoted and utilized.

1. *Development mindset and empowering culture* with priority given to education, continuous learning and the promotion of self-reliance and community development. Tanzania should reward hard work, creativity and entrepreneurship, and develop a culture of saving and investment. Education should promote creativity and problem solving, serve as an agent for transformation and provide the knowledge needed to solve the challenges facing the nation.
2. *Competence and competitiveness* with development facilitated by a positive business environment, sound economic management and improved infrastructure (roads, energy, water and telecom) to stimulate investment and economic activity. Science and technology can enhance productivity and should permeate society through continuous learning. *ICT should be harnessed in all sectors to increase productivity and competitiveness but this demands investment to improve the quality of education.*
3. *Good governance and the rule of law* to facilitate development, equity, unity and peace but requires public participation against corruption. The role of the state must be redefined to facilitate participation in the market. The state should provide a legal and regulatory framework and invest, and encourage others to invest, in infrastructure development and in education and training (United Republic of Tanzania, 1996).

There are, thus, two key prerequisites for effective implementation of the Vision 2025: good governance and a competitive economy. Vision 2025 seeks to tap patriotism to strengthen national cohesion but it Vision must be participatory and people-centred to obtain genuine commitment towards realizing the goals.

Criticism of Arusha and Vision 2025

Political scientist Ernest Mallya argues that Vision 2025, like Arusha, contains “a set of over-ambitious goals and objectives which are too many for a poor, dependent economy to pursue concurrently in as short a period as 25 years” (Mallya, 2002:3). He notes that in the 1980s literacy rates fell because of the introduction of education user fees and argues the issue of corruption has yet to be resolved and is not helped by the weak presence of civil society organizations. Indeed, the anti-corruption organization Transparency International (TI) argues political elites and cronies along with corrupt business people are trapping whole nations in poverty. In its 2002 ranking, Tanzania improved over previous years but still faced challenges and was in the same group as Ivory Coast, Honduras, India, Russia and Zimbabwe (TI, 2002). Mallya argues Tanzania should focus on the issue of good governance, which is within its capacity to resolve. Despite his criticism, Tanzania’s increased economic growth

and transparency of governance has impressed international observers (Rylander, 2002).

ICT in Tanzania

The use of ICT is growing rapidly in most developing countries and Tanzania is no exception but most of the population remains isolated from telecommunications and information technology and face many barriers before reaping the benefits of new technologies. However, there are numerous opportunities to expand telecommunications infrastructure as well as implement even basic ICT solutions to improve efficiency and service and foster broader economic growth. In 2001 it was estimated that Tanzania's ICT industry generates USD 300–350 million per year, with the Tanzanian Telecommunications Commission Limited (TTCL) accounting for almost half the revenue (Miller, Esselaar and Associates, 2002:18).

The fact that Tanzania is one of the poorest countries in the world means there are many opportunities to explore. Moreover, the country has entered a positive stage of its development where government policy, bi-lateral donors, international agencies and private sector participants are working together to forge ahead. ICT has been acknowledged as a unifying factor, which can accelerate the socio-economic development of the country.

There are now a number of ICT development initiatives in Tanzania funded by different organizations and countries. Many of these are complementary despite their non-coordinated implementation. Projects range from telecentres in rural Tanzania to e-Government initiatives being implemented in the heart of Dar es Salaam. The International Institute for Communication Development (www.iicd.org) is developing a "Who is Who" in Tanzania's ICT to help people gain an insight of who is active in the field of ICT and development, understand the activities undertaken and location of these activities. Indeed, there are ICT players of interest covering the entire economic spectrum of Tanzania, including in the private sector, the public and parastatal sectors, non-governmental organizations, and education and training institutions. The directory will be posted on the internet.

Infrastructure requirements for ICT development

There are three infrastructure pillars required to foster development of ICT in any country: 1) *human capital infrastructure* to design, implement, manage and use ICT applications and services; 2) *legal and regulatory infrastructure* to support and promote adoption and diffusion of ICT; and 3) *technical infrastructure*, especially telecom infrastructure, to provide the platform for delivery of applications and services. Yonah argues that the following stakeholders should be involved in deploying ICT.

- Public (i.e., TTCL) and private telecommunications network operators.
- Internet Service Providers (ISPs).
- Web Content Providers (ASPs).
- Equipment Manufacturers.
- Hardware/Software Vendors and Suppliers.
- E-Commerce Trust Providers.
- Professional Services Providers/Proprietary System Providers.
- Customers (Yonah, 2002).

This report addresses the critical need to support human resource development to facilitate the design, implementation and management of ICT applications and services (i.e., telecommunications, internet expansion, efficiency measures involving ICT, etc.) in Tanzania. Indeed, the country's growth is being restricted by a shortage of qualified workers with ICT skills (Lamtrac, 2001).

The network in Tanzania

Tanzania has a hybrid (i.e., digital, analogue) telephone network using fibre optic, microwave and satellite links. It is over 95 per cent digital, which paves the way for the introduction of new services enabled by ICT. However, there is not sufficient capacity, speed, coverage and reliability and these upgrades must be made to stimulate and accommodate growth. Yonah argues "there is a large unsatisfied demand in the country for internet access. Tanzania now has access in 16 regions: Dar es Salaam, Arusha, Moshi, Tanga, Dodoma, Morogoro, Iringa, Mbeya, Singida, Tabora, Shinyanga, Mwanza, Musoma, Moshi, Mtwara, and Zanzibar" (Yonah, 2002). However, local ISPs struggle to connect their points-of-presence to the internet backbone and, consequently, Tanzania lacks low cost, high capacity connections to the internet. Moreover, the lack of a national Internet Exchange Point means that Tanzania's local traffic is routed via international routes, which increases costs.

Overall, there is inadequate investment to build a sufficient user base to sustain connectivity to global information infrastructure. International experience has shown that the ability to communicate can facilitate the development process by increasing efficiency, effectiveness and equity. Tanzania needs to seize the opportunities enabled by ICT for realising national objectives.

Telecommunications

Tanzania has one of the least developed fixed-line telecommunications networks in the world. The privatization of the national telecommunications company (TTCL) was a major step forward but the South African company (MSI) that purchased 35 per cent of TTCL has been fighting with the government over the paying subscriber base and uncollected debts. Moreover, many Tanzanians feel the company is more interested in maximising short-term profit than building the country's communications infrastructure. Sadly, the dispute may delay much-needed expansion of telecommunications and may cause other international companies to pause before investing in the country. The government and MSI tried, unsuccessfully, to resolve their differences through a joint task force and MSI has brought the issue before a London court over the payment of the second instalment of the purchase price. Regardless, it appears likely that the number of fixed-lined connections in the country will increase significantly in the years ahead though perhaps less dramatically than the explosive rate of mobile phone growth.³³

³³ When TTCL was privatized in 2000 there were 165,000 fixed-lines in Tanzania. A condition of TTCL's landline monopoly is that at least 800,000 lines must be connected by the end of their exclusivity period in February 2005. However, in early September 2002 it was estimated that TTCL had only 150,000 operating fixed-lines (only one line for every 235 residents), out of a capacity of 200,000 because the newly commercialised company had disconnected a number of non-performing accounts (Kowero, 2002). Therefore, it appears unlikely that TTCL will reach its target of 800,000 lines by 2005 and this will,

The mobile market

The number of mobile phone subscriptions in Tanzania has grown rapidly in recent years and there is no sign of a slowing of this growth yet. Indeed, the number of mobile phone subscriptions has increased dramatically – 65 per cent per annum – from an estimated 75,000 in 1998 to 550,000 in 2002. Mobile phone subscriptions by provider are illustrated in table 4.3 below.

Table 4.3 Mobile phone subscriptions in 2002

Company	Estimated number of customers (August 2002)
Vodacom	250,000
CelTel	70 – 100,000
Mobitel	200,000
Tritel	20,000
Zantel	6 – 10,000
Total	550,000

(Source: Kowero, 2002)

One factor that may limit mobile growth in Tanzania is the high cost of airtime with Tanzanians generally paying USD 0.35 per minutes with minimal discounts during off-peak periods. Most Tanzanians use pre-paid services and, given the combination of low incomes and high costs, rarely use their mobiles for out-going calls. Despite this, the mobile explosion has given many Tanzanians phone access and the number of mobile subscriptions is now 350 per cent higher than fixed-lines accounts.

Five levels of ICT

If we apply the five-stage ICT skills chart developed for this project, illustrated in table 3.5 below, the vast majority of Tanzanians are at levels one and two. There are, however, a growing number of people at level 3 as evident in the exploding number of internet cafes in major centres in the country. Indeed, some estimate that there are up to 1000 internet cafes in Dar es Salaam alone (Miller Esselaar and Associates, 2001).

Table 4.4 Five levels of ICT skills

Level	Estimated % of population	ICT awareness and skills
Level 1	50	Little or no awareness of ICT, especially of computers
Level 2	45	Aware of ICT and computers but no skills to use them
Level 3	5	<i>ICT users</i> – computer business applications (e.g., word processing, spreadsheets, e-mail, internet)
Level 4	<0.01	<i>ICT technicians</i> design websites, data bases, install telecommunications <i>Power users and 'IT Fundis'</i> train other staff, advise management on ICT, etc.
Level 5	<0.001	<i>ICT professionals</i> (hardware engineers, software engineers, telecommunications engineers etc.)

Tanzania has shortages of people at levels 3, 4 and 5. Arguably employers, both in the public and private sectors, have a large role to play in training individuals to level 3 (i.e., employees using business applications) and much donor support has already gone to the University of Dar es Salaam to train professionals at level 5. Training to level 4, however, is not well developed and is critical to support an expansion in the number of ICT users at level three. Indeed, ICT technicians are also needed to support ICT professionals in rolling-out the country's ICT infrastructure. Therefore, it is argued the shortage at level 4 is the most critical impediment to Tanzania's advancement in information and communication technologies.

As Tanzania emerges from Nyrere's experiment in African socialism the economy has shown improved growth, mainly focussed on Dar es Salaam. The country has started to deregulate and the Tanzania Communications Commission (TCC) has initiated an effective regulatory regime for mobile telephones with more competition than most countries of its size. Tanzania's internet and data markets have shown steady, moderate growth and import tariffs were removed from computers. Perhaps most important, an ICT policy framework is being driven by forward-thinking industry and government leaders.³⁴

The internet and Tanzania

The growth in internet usage slowed somewhat after TTCL doubled its rates to Tsh 40 shillings a minute in 2001. The vast majority of users access the internet through internet cafes though there are is a modest dial-up subscriber base. One factor limited internet subscriber growth is the extremely limited number of fixed telephone lines in the country. Estimates of the number of internet subscribers in Tanzania vary widely between 15–20,000, as shown in table 3.6.

Table 4.5 Internet accounts by internet service provider (ISP)

ISP	Subscriber estimate
Africa On-line	2000
Raha.com	3000
Tele2 (formerly Cyber Twiga)	1000
Catsnet	2000–3000
Internet Africa	2200
Habari.net (Arusha)	450
Zanzinet	250
UDSM	500
Total	15,000–20,000

(Source: Tanzania Special, 2002)

There are probably less than 2,000 subscribers outside Dar es Salaam. Cyber Twiga was bought by Mobitel and changed its name to

³⁴ In August 2001 the Minister of Communications and Transport formed the task force chaired by Matthew Luhanga, Vice Chancellor of UDSM, to develop an ICT policy for Tanzania. The National ICT Policy Draft is in line with the aspirations espoused in Vision 2025. Indeed the entire cross-cutting nature of ICT opportunities is wrapped around the five main points of 2025. ICT can play a major role driving development but, if misapplied, could result in further marginalization of the poor and the unconnected (Luhanga, 2002).

Tele2 and Raha.com has sold a 50 per cent share to one of Tanzania's largest PC dealers, Computacentre. As with mobile phone accounts, many ISPs have introduced pre-paid systems with a scratch card and most clients use it. Internet access costs approximately USD 30–50 per month plus connection charges, a cost exceeding the GDP per capita. Wireless-based services are common and command only a modest price premium over dial-up access with one large provider charging USD 50 per month (unlimited use) after an initial charge of USD 200 for the necessary equipment. Local ISPs have seized the opportunity to use wireless networks and the TTC has not, to date, stopped them from doing so. As a result there are a number of ISPs offering wireless networks both inside and outside Dar. Africa Online's General Manager sees "areas of growth like Mwanza with mining and tourism. Also we've got three ministries hooked up to the internet and government could be the next area to provide a boost. The three biggest current markets are mining, banking and NGOs" (Tanzania Special, 2002).

The corporate internet market is estimated at 250 companies, many of which entered the country after the economy was liberalised. ICT companies sell a basket of connectivity solutions including and are expanding with local partners in other African countries. For example, Simbanet is designing a new network for the Ministry of Finance in Uganda that it will operate for one year and then pass on to a local operator. It also trying to raise interest in e-Kiosk, a touch-screen facility for remote areas with information in local languages that would allow users to send e- and voice-mail. A similar idea has been piloted by the Tanzania Commission for Science and Technology (COSTECH).

Internet Cafes

Internet cafes play an important role supporting areas such as education, health care, local democracy and small business support. They also provide access to ICT that can offer development services in a number of areas that can assist in the development process (Nnafie, 2002).

There are wide ranging estimates on the number of internet cafes in Tanzania but it is safe to say there are well over 100 in Dar es Salaam and perhaps 150 elsewhere. Many are small family-run businesses. Access costs range between TSh 500–1000 per hour in Dar, with hotels charging TSh 3000 and up. Prices tend to be higher in smaller centres with, for example, TSh 2000 per hour common in Arusha. The cost of a 128K leased line has gone down to under USD 400 per month but the viability of many internet cafes is questionable given the low rates, especially in Dar (Miller Esselaar and Associates, 2001). Many use internet cafes to make international computer-to-telephone calls despite the fact that VOIP (voice over IP) has been banned by the TTC. It is said that the TTC has been cracking down on providers but I witnessed VOIP calls being made in internet cafes in central Dar. Moreover, given the fact that emerging technologies are difficult to control, these calls will likely capture a portion of the international long distance market, especially given the very high rates to call overseas.

ICT services

The market for website design is emerging in Tanzania. Most ISPs offer web design services and there are also several web design companies. E-commerce has not yet emerged in Tanzania but that may be a potential growth area in the coming years. Another potential area of growth is in banking where many ICT skills will be needed as the country develops electronic banking, credit card and bank machines. There are very few bank machines and business that accept credit cards in Tanzania at present and the introduction of these technologies will require workers with ICT skills to implement. Finally, the installation, maintenance and servicing of the growing number of fixed telephone lines will create a large market, especially if TTCL meets its goal to more than quadruple the number of lines by 2005. One of the biggest challenges for the TTC is what to do when TTCL's exclusivity ends in 2005. The challenge for the regulator is how to introduce competition in a manner that will both increase investment and decrease prices. Ideally, a dynamic similar to that in the mobile market will emerge and investment, the market, will expand rapidly.

Africa has made rapid progress in implementing ICT in recent years (e.g., internet connectivity and spread of telecommunications services). In this regard, Africa is doing well but merely being able to make a mobile telephone call or connect to the internet does not necessarily translate into economic growth and increased opportunities for people to participate in the economy. The internet cannot transcend poverty; it cannot transcend politics of isolationism, repression and exclusion; and it cannot transcend the absence of basic communication infrastructure (Mufuruki, 2002). Moreover, owning a computer is out of the question for 99 per cent of the population in Tanzania and those who do find it difficult to afford high internet connectivity costs. Consequently, only a tiny minority of wealthy individuals in urban areas connected to electricity and telephone services can access the internet from home (Mufuruki, 2002). *Therefore, the key challenge for Sida is to identify ICT opportunities that facilitate broad economic growth and therefore benefit a wide range of Tanzanians.*

Universal access

ICT provides an opportunity to generate and access diverse information and new applications can play a role in alleviating poverty and enabling new learning techniques. At the same time there are fears that inequalities in the distribution of access to ICT will further widen the gap between rich and poor and that technology will only benefit those who already have access to the knowledge and economic resources needed to participate in a global society (Mpungwe, 2002).

In the long-term, universal access should be a goal when developing policies to support ICT in Tanzania. Enabling as many people as possible to use ICT will spread technology more quickly, support expansion of infrastructure and enhance the country economic competitiveness. "In addition to seeking political and economic stability, companies look for an educated workforce and an infrastructure that will support business operations. Universal access can help meet these needs" (Mpungwe, 2002). After supporting critical physical infrastructure and human resources for ICT expansion in Tanzania, international and donor

agencies may want to consider supporting measures, such as COSTECH's community telecentre initiative, to bring ICT to the people, so to speak.

COSTECH is responsible for coordinating and promoting research and technology in the country and is implementing several other ICT-based projects to solve the digital divide at community level including the following:

1. *ICT for Good Governance* in Kinondoni and Dar es Salaam has been implemented since 2000. It received technical and financial support from the Netherlands-based International Institute for Communication and Development (IICD). The project is geared towards facilitating the application of ICT in promoting good governance and COSTECH and IICD are interested in expanding the concept.
2. *Zanzibar Municipality: E-Governance for African Municipalities* project since 2001 has been implemented in cooperation with Zanzibar, UNESCO and Denmark. The activities under this project include setting up a local area network and website, establishing a Municipal Public Information Centre and conducting training programs for municipality staff and end users.
3. *Rural Telecentres* are being built by COSTECH in its endeavour to ensure that rural areas are not left outside the ICT revolution. Telecentres offer multimedia access and incorporate ICT for access to information for decision-making and development. The first one was established in Sengerema, Mwanza as a pilot project supported by international and national partners. It is equipped with five computers with wireless connections to the internet and many ICT training courses are conducted. A second telecentre was established in Lukole, geared to refugees as well as to international agencies and the local community of Ngara. A third telecentre is proposed for Kasulu in cooperation with the UNHCR. This would provide internet access at Kasulu Folk Development College, Kasulu Teachers College and for Burundian refugees.
4. *ICT Training* where COSTECH provides training for groups, the Tanzania Public Service College and the general public offering programs such as the *ICDL to empower* trainees to participate in the new knowledge-based society. ICDL is internationally recognized proof of ability to use a computer and business applications. The introduction of this program followed the certification of COSTECH as an ICDL training and test centre.
5. *ICT in villages* where COSTECH has proposed pilots for Lunga-Lugoba in Bagamoyo District and Dakawa in Morogoro District. This would introduce computers in the villages, enhance good governance and support local development. COSTECH will introduce databases as part of the ICT in the villages focused on primary sectors such as agriculture, education and health sector.
6. *Internet Service Provider* where COSTECH bolsters internet availability in Tanzania. COSTECH statistics show that Tanzanians sends approximately half the bytes of email that is receives.

Barriers to ICT development in Tanzania

The UN ICT Task Force identified several actions to support ICT in developing countries including the necessity to improve connectivity, increase access and lower costs. The high cost of bandwidth, in particular, is a barrier to internet in LDCs.³⁵ “Bandwidth costs in Africa in the 1990’s were characterized by, incumbent Telcos and Internet operators, extracting maximum return out of their positions in monopoly or partially liberalized markets” (Bell, 2002). In the first years of the twenty-first century, access costs actually increased in Tanzania despite deregulation and increased competition. Throughout Africa bandwidth costs are higher than in developed countries. The Halfway Proposition aims to identify the causes of high connectivity costs in Africa and map out a strategy to address the problem. At present, African Internet Backbones (AISPs) purchase bandwidth from International Backbone Providers (IBPs) based in wealthy countries. The vast majority of the cost is related to connecting to the international backbone. Costs were reduced in Asia in the 1990s but the market is large compared with Africa and volumes drive prices down. The Halfway Proposition is a strategy that borrows the experience of Asia and adapts it into a realistic strategy for Africa. The strategy revolves around the need for:

- Traffic aggregation (the size of the markets is too small to provide any commercial incentives to do so);
- Linking Africa (particularly East Africa which has no international maritime fibre) to the rest of the world; and
- Linking the major population centres within countries and regionally.

ICT and NGOs in Tanzania

Many donor agencies and international agencies are supporting the expansion of ICT in Tanzania. For example, the IICD is collaborating with Infowise Technologies to bridge the digital divide by conducting seminars with various stakeholders. NGOs, private firms and the University Computing Centre as well as the Global Distance Learning Centre (GDLC), which has received support from the World Bank, at the Institute of Finance Management (IFM) are involved in this initiative. Obviously, cooperation and sharing resources will increase the effectiveness of ICT human resources development in Tanzania.

Sida recognized the critical importance of ICT in economic development when it appointed an ICT project manager at the Swedish Embassy in Dar es Salaam to oversee ICT in development cooperation until at least 2004. The ICT project manager will ensure the mainstreaming of ICT in ongoing and planned sector projects where appropriate.

Conclusions on the ICT sector in Tanzania

Overall, much work remains to be done to bring Tanzania’s ICT infrastructure up-to-date. The TTC is addressing the myriad of regulatory issues and the country is developing a national ICT framework, which address two of the issues raised in the *Country ICT Survey for Tanzania*.

That survey also recommends increasing access to venture capital and establishing an ICT cluster in Dar es Salaam. They also recommend increasing the capacity of DIT to deliver ICT technician training, expanding support for distance learning to spread

³⁵ For more detailed information on the cause of high connectivity costs, and obstacles to reducing them see www.itu.int/ipdc.

ICT to rural areas, creating a school networking body to spearhead ICT in schools and introducing recognised certifications such as the International Computer Driving Licence (ICDL) to ensure quality (Miller Esselaar and Associates, 2001).

Education in Tanzania

Education has been the pillar of social policy since Tanzania achieved independence in the early 1960s. Indeed, the OECD development centre concludes that “education has long been a source of pride for Tanzania”(OECD, 2002:124). However, early successes were followed by declining school enrolment and Tanzania lacked the economic resources to support a quality, universal education system. Given Tanzania’s limited resources, ICT training is emphasised at the small post secondary level rather than throughout the primary and secondary system.

Early education policy trends in Tanzania

In the early 1960s Tanzanian education policy was influenced by the UNESCO commission of 1961, which prioritized the expansion of secondary and tertiary, including technical, education to fill new positions after independence and meet other human resource requirements, especially (Kolouh, 1993:12). The first concrete reforms in the newly independent country were to abolish the racially-based system; streamline the curriculum, examinations, administration and financing of education; promote Kiswahili as a national language by making it the language of instruction in primary school; make local communities responsible for the construction of primary schools and provision of primary education; and establish a unified teaching service for all teachers (Ministry of Education, 1995:i-ii).

By the late 1960s, however, the policy orientation shifted towards a more agricultural- and rural-based education system and in 1967 the philosophy of Education for Self Reliance (ESR) was introduced.

Education for self-reliance

Julius Nyerere articulated the policy of ESR as part of the Arusha Declaration in 1967. The goal was to move the school system away from the British colonial model to:

- Make education more Tanzanian and the system more relevant to Tanzanian needs;
- Reduce elitism and the tendency for schooling to further inequality;
- Emphasise cooperation rather than individual advancement;
- Develop a socialist and self-reliant value system among citizens; and
- Integrate schools into communities and prepare most to work in agriculture (Nyerere, 1968).

Therefore, the emphasis on liberal arts education in the early 1960s shifted towards the national self-reliance articulated in Arusha. By the 1970s, it was feared that Tanzania was training too many people beyond the primary school level so, in 1974, the Nyerere government capped expansion of post secondary institutions and enrolment. The government also forced secondary school leavers to either work or take practical vocational training. Direct entry to university was stopped and students were required to work for at least two years after secondary school before

entering university. Overall, resources were shifted towards primary education (Kolouh, 1993:12–13).

A number of changes were grouped together in the Education Act of 1978 where power was more centralized with the Ministry of Education. Universal primary education was supported in the Act with primary school enrolment made compulsory for children aged 7 to 13. Curriculum was centralized, teachers were registered and licensed and schools were grouped into two categories:

1. *National Schools* including all public schools, other than primary schools and adult education centres, managed by local authorities, Folk Development Colleges and Colleges of National Education; and
2. *Regional Schools* including all primary schools and adult education centres (Ministry of Education, 1995:iv–vi).

A series of significant reforms followed the report of the Presidential Commission on Education in 1982. It recommended the establishment of an association and commission for teachers; the establishment of the Soikoine University of Agriculture, the Muhimbili University College of Health Sciences, the Open University of Tanzania, and a Faculty of Education at the University of Dar es Salaam (UDSM); and the formulation of a National Policy for Science and Technology (Ministry of Education, 1995:vi–vii).

Reflections on education in Tanzania during the Arusha era

Tanzania's emphasis on education achieved impressive early returns after independence and Arusha. However, the OECD Development Centre concluded that ultimately socialist and voluntarist education policies failed in Tanzania because of a lack of coherence (e.g., schools built without teachers) and unsustainable economic policies. Moreover, the administration was not capable of overseeing a truly national education policy (OECD, 2002:8). The laudable goals outlined in Arusha did help Tanzania achieve almost universal primary enrolment but poor economic conditions doomed the country's efforts and Tanzania now ranks among the lowest in the world in per capita education spending. The impact of HIV/Aids³⁶ has also been profound with one million children orphaned the country's life expectancy dropping by five years in just a decade. There is also evidence that Aids is impacting teachers harder than the general population. These factors make it important for policy makers to "be realistic and accept the fact that universal access to education and health care will take time" (OECD, 2002:11).

Enter the market

After the reforms of the 1980s and 1990s the education system in Tanzania was realigned to facilitate partnerships in the provision of education and training through the deliberate encouragement of private agencies to participate in the provision and management of education. The financial base of education has also been broadened in recent years and more control has been devolved to communities and schools. Over-

³⁶ In 1997 Tanzania's rate of AIDS infection was 281 per 100,000, the highest in East Africa. By the end of 1998, the National AIDS Control Program estimated that the rate had increased to 365 per 100,000 and by 2002 it was estimated that almost ten per cent of Tanzania's adult population were HIV positive. The infection rate is projected to increase to almost 15 per cent by 2005 (OECD, 2002:117).

all, recent education reforms have been more geared to market needs and issues such as quality though access has been reduced with the introduction of higher user fees (OECD, 2002).

Education for All

The goal of universal primary education is the most important education policy target in LDCs. It has been espoused by the United Nations since 1949 but the realisation of it remains elusive, especially in sub-Saharan Africa. Many developing countries were inspired by the World Conference on Education for All (EFA) held in Jomtien, Thailand in 1990. The EFA conference put the spotlight on education in development and some progress has been achieved in the years since the Jomtien framework was agreed to. The basic goal of EFA is universal primary education (UPE), something which Tanzania embraced decades ago when it introduced the UPE policy in 1977. More recently, the Education and Training Policy of 1996 demonstrated Tanzania's commitment to EFA (Mmbaga, 2002). And Vision 2025 clearly states the goal of UPE. However, Tanzania is one of the countries identified as being at risk of not meeting the goal of universal primary completion by 2015 (World Bank, 2002).

At the World Education Forum in Dakar, Senegal in 2000 delegates from 164 countries reaffirmed their commitment to Jomtien and adopted the following strategies for achieving EFA under the Dakar Framework for Action. Dakar requests that all states develop national action plans by 2002 with concrete strategies to achieve the Dakar goals.

1. Expand early childhood care and education.
2. Free and compulsory education of good quality by 2015.
3. Promote the acquisition of life-skills by adolescents and youth.
4. Expand adult literacy by 50 per cent by 2015.
5. Achieve gender equality in education by 2015.
6. Enhance educational quality (UNESCO, 2002).

These goals were echoed in the Millennium Development Goals (MDGs), agreed to by 189 countries. A key MDG was the achievement of UPE but recent research indicates that the achievement of this by 2015 will be very difficult. Although progress was made in many countries in the 1990s, 17 middle-income and 21 low-income countries experienced stagnating or declining primary completion rates (World Bank, 2002:vi). Overall, only 36 of 155 developing countries have achieved UPE, 30 are on track to reach the goal but 89 countries, including Tanzania and 32 other low income sub-Saharan African countries, are "at risk" of not achieving UPE by 2015 (World Bank, 2002). To meet this challenge the World Bank is developing country-specific plans for 47 at risk countries, 43 of which cannot meet UPE according to World Bank simulations. These plans are designed to support the commitment made in Dakar (i.e., that no country with a "credible plan" for achieving EFA would fail for lack of external support).

Key actors in the drive for EFA are countries, civil society (including NGOs, teacher and religious organizations, parents and learners); and development partners such as Sida. But providing the world's children with primary education may require an additional USD 8 to 15 billion education spending annually (UNESCO, 2002). Thanks to a relatively

high priority on education, and the absence of violent conflicts, Tanzania is in a better position in this regard than some LDCs. However, the country has a long way to go to reach the EFA goals, which will, in turn, support the expansion of ICT in the country.

Primary and secondary education in Tanzania

The structure of the formal education and training system in Tanzania consists of two years of pre-primary education; seven years of primary; four years of (ordinary “O” Level, or Forms 1–4); two years of upper secondary (Advanced “A” Level, or Forms 5–6); and tertiary education. The education system has three broad levels: Basic, Secondary and Tertiary. The Ministry of Education and Culture is responsible for administering and funding the primary and secondary systems and also organizes teacher-training colleges. Three ministries manage and coordinate the education sector: the Ministries of Education and Culture, Higher Education, and Labour. Moreover, the Ministry of Regional Administration and Local Government also plays a role in basic education. The Tanzania Institute of Education, established in 1964 as part of the University of Dar es Salaam, supports curriculum development while the Tanzania Institute of Adult Education, established in 1975, researchers, advises and develops adult education in the country.

Tanzania’s economic problems have led to a major shortage of teaching aids in schools. The vast majority of primary schools are public but facilities are modest and often lack electricity. There are also severe shortages of basic requirements such as classrooms, toilets, supplies, tables and chairs. *Sweden supports the development, production and distribution of schoolbooks and aid is also being provided for the further training of teachers and for improvement of the cooperation between vocational colleges and the labour market* (www.sida.se/Sida/jsp/Crosslink.jsp?d=294&a=8831).

Admission into government secondary schools is limited and very competitive and only those scoring high on the Primary School Leaving Exam (PSLE) are granted entry. Private secondary schools are widespread and now enrol more students than their public counterparts. Private schools cater a wide range of groups with the bulk of their enrolment composed of those not admitted to government schools. There are also many private secondary schools run by religious organizations as well as other organizations and, of course, high quality schools for children of expatriates and of the wealthy.

Since 1967 the language of instruction has been Kiswahili in primary schools though English is taught starting in standard 3. English is the language of instruction in secondary schools but there is a significant problem with language skills of both teachers and students. Government schools were tuition free until the mid-1980s but modest fees are now imposed and serve as barriers for participation of children from poor families. Indeed, in the 1980s the provision of all schooling, but especially secondary schooling, was severely limited because of Tanzania’s economic crisis. A decade after the boom in schooling and literacy that followed the Arusha Declaration, Tanzania experienced declining enrolment. By 1989 the primary completion had dropped to 46 per cent but recent improvements have resulted in an estimated completion rate of 59 per cent by 1997 (World Bank, 2002: 22). Primary and secondary enrolment and adult literacy rates by region are illustrated in table 4.6.

Table 4.6 Enrolment and literacy rates in Tanzania by region (per cent), 1993

Region	Primary Net Enrolment Rate	Secondary Net Enrolment Rate	Literacy Rate
Dar es Salaam	53.6	15.3	88.9
Northern Zone	58.3	15.4	84.4
Zanzibar	64.8	23.0	65.8
Coast Zone	52.3	8.1	77.3
Lake Zone	51.9	6.6	78.6
Southern Highlands	57.2	11.2	77.2
Central Zone	45.0	3.6	71.3
Western Zone	44.7	7.1	70.1
South	41.3	4.3	61.8
Urban (excluding Dar)	59.1	15.7	82.5
Rural	47.9	4.5	70
Male	51.0	10.9	85.5
Female	54.3	10.2	71.3
Total	52.6	10.5	78.1

(Source: OECD, 2002:144)

Although the gender gap is not so marked in terms of school attendance, there are significant gender differences in literacy. The disparity in urban-rural enrolment rates are very significant at the secondary level with 350 per cent higher secondary enrolment rates in urban areas. Overall, the system is of poor quality with unequal access to higher education and quality schooling largely restricted to the elite. Even the select few that make it to university are not prepared due to poor quality education at the secondary level in Tanzania (Rajani, 2002). The Tanzanian NGO HakiElimu is working to address the poor quality of education and to “realise equity, quality, human rights and democracy in education in education by facilitating communities to transform schools and influence policy making, stimulating imaginative public dialogue and organizing for change, conducting critical research, inquiry, analysis and advocacy and collaborating with partners to advance common interests and social justice” (HakiElimu, 2001).

Very few Tanzanians complete secondary school, even relative to other African countries. In fact, less than 50 per cent complete primary school. School completion trends are explored in table 4.7 below. There are significant disparities of education by region and gender, especially at the secondary levels where almost 14 per cent of urban residents complete lower or upper secondary school compared with only 3.4 per cent of rural residents, and only 0.4 per cent of females complete upper secondary compared with 1.4 per cent of males. *Clearly, the secondary delivery ability is minimal and this must be considered when planning human resource development for the ICT sector.*

Table 4.7 Highest education level completed for population aged 7 and above

Region	Per capita spending (Tsh)	No formal Education (%)	Some primary (%)	Complete primary (%)	Lower secondary (%)	Upper secondary (%)
Dar es Salaam	244 252	16.7	25.6	41.1	12.3	2.0
Northern Zone	155 656	16.0	33.8	34.9	10.5	1.0
Zanzibar	147 405	31.4	30.0	12.1	23.5	0.6
Coast Zone	126 761	24.1	34.7	31.9	6.8	0.6
Lake Zone	117 213	23.3	34.0	34.2	5.9	0.7
Southern Highlands	103 158	21.4	34.8	31.6	7.0	0.9
Central Zone	81 181	32.9	25.3	37.5	2.6	0.3
Western Zone	74 436	30.6	25.2	36.1	4.8	0.3
South	71 613	31.8	33.4	28.5	2.1	0.4
Urban (excluding Dar)	149 576	17.9	31.6	33.6	12.3	1.2
Rural	85 408	30.0	32.8	31.3	3.2	0.2
Male	18.9	33.1	33.8	9.6	1.4	
Female	27.3	29.1	34.1	6.7	0.4	
Total	136 596	23.2	31.0	34.0	8.1	0.9

(Source: OECD, 2002:142)

The impact of fees in education

After independence, Tanzania prided itself on the introduction of free primary education for all. Low government revenues and high debt repayments have since seen schools starved of cash. The government now spends twice as much per capita on debt repayments as on education. Pressures from international institutions to introduce cost recovery have seen the introduction and increase of fees and other charges levied on all parents. More than two million Tanzanian children are not in school, and illiteracy is rising at 2 per cent a year. In some schools there is one desk for every 38 pupils; one textbook for every four children; one toilet for every 89 pupils. Classrooms crumble unless parents can fund their rebuilding. Teachers have been left demoralised by falling salaries, worsening conditions, and increasing class sizes.

Unlike Kenya and Uganda where children are sent home if fees are not paid, in Tanzania primary schooling remains compulsory under the Education Act so administrators are forced to act as debt collectors until payments are made. Unfortunately, many parents cannot afford the charges.³⁷ Sadly, fees and other charges are making it difficult for parents to send all their children to primary school (Oxfam, 2002).

Education challenges

Tanzania made major achievements in primary education until the early 1980s. After independence, the goal of universal primary education was established and enrolment in primary education peaked at 96 per cent in

³⁷ For example, in Shinyanga District's rural schools, only 36 per cent of fees were collected in 1997.

the late 1970s, a much higher than most countries in sub-Saharan Africa. However, since the 1980s there has been a decline in primary education standards (80 per cent of primary school leavers score less than 50 per cent in the primary school leaving exam) and participation (enrolment rates have dropped to about 75 per cent). Classrooms are in poor condition, teachers lack basic teaching materials and there are serious shortages of textbooks,³⁸ desks, chairs and toilets. Teachers' morale, motivation and wages are low. Worse, Secondary school enrolment rates of around seven per cent are among the lowest in the world (McNabb, 2002 and Oxfam, 2002). *Tanzania's education deficit is a barrier to integrating ICT, increasing economic growth and, consequently, reducing poverty. Improving participation in, and quality of, education, especially for girls, is vital to raising productivity* (Oxfam, 2002b).

The Basic Education Master Plan (BEMP)

The Government of Tanzania recently introduced the Basic Education Master Plan to reform learning in the country. The BEMP sets targets for improvement in basic education for the period 1997–2002 and identifies mechanisms to improve basic education. The targets include:

- Increasing gross enrolment to 85 per cent;
- Completion rates of 80% with 20% gain in student performance;
- Increasing the education share of the budget to 25 per cent (1994 levels);
- Raising the primary education share of the education budget to 65 per cent;
- Raising the non-salary portion of the budget from 7 to 20 per cent; and
- Raising average pupil – teacher ratios from 36 to 45.

The BEMP notes that increased resources are needed in order to address the quality of education in Tanzania but it supports cuts in the real wages of teachers at a time when morale in the teaching profession is low. Overall, the poor quality of education is negatively impacting both enrolment student performance and budgetary support needs to be addressed. Another difficulty concerns parental contributions to basic education. The principle of community financing (i.e., where parents meet some of the costs of primary education) has increased due to inadequate public education financing. "Oxfam's experience is that educational costs are already imposing extreme hardship on poor households, excluding many of them from the educational system. This raises the question of whether or not the BEMP should endorse the principle of community financing, or seek to establish free universal primary education" (Oxfam, 2002b).

Role of the Public and Private Sectors

The government role is now changing from that of a key player to that of a facilitator in the provision of education. This new role of the government provides a more conducive environment for the private sector to increase its investment in education. Private investment in education will

³⁸ Organizations such as Distance Learning and Education Services (DILES) are working to develop lower cost learning materials to support students and schools, especially in rural regions.

establish a more learning environment that will foster both knowledge and technology and allow more active participation in the agricultural sector and the economy as a whole (Ministry of Education, 2002).

Overall, despite some progress and good intentions, “the basic education system is an absolute disaster, which is a legacy of political decisions to expand basic education without adequate resources. Another drawback to the system is the Nyerere’s decision that people do not need secondary education. Only about 15 per cent of school leavers go to secondary education, not much than five per cent of the age cohort” (McNab, 2002).

Post-secondary education

Post-secondary education, vocational training and apprenticeship in Tanzania are funded by the Ministry of Higher Education, Science and Technology, Ministry of Labour, respectively. The number of institutions at tertiary level in the country was at 28 in 2000. Nine of these institutions are recognised as public or private universities, seven university colleges and twelve non-university tertiary level institutions.

The only major university in the country is the University of Dar es Salaam (UDSM), established in 1961. There are somewhat over 6000 student enrolled, over 100 of whom at *the university’s autonomous University Computing Centre (UCC)*. *The UCC has received significant support from Sida and has first-class facilities and equipment. It operates commercially and is free to set tuition fees and export its product.* In fact, it has established satellite centres in Arusha, Mwanza and Dodoma and is actively expanding its programs to meet the need for ICT professional and technicians. Sida has played a major role supporting UDSM to become a leading university between the Sahara and South Africa with advanced ICT infrastructure and facilities for administration, education and research. This has made UDSM a centre of ICT expertise in the country and region, providing ICT consultancy and training to organizations in and outside the country.

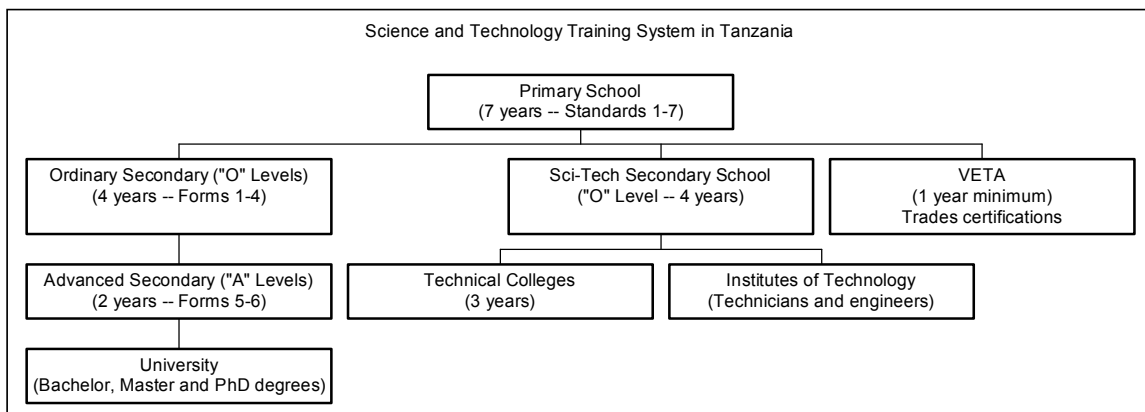
The country’s second largest institute of higher education is the Dar es Salaam Institute of Technology (DIT). It was founded in 1957 and it became an autonomous parastatal, as UDSM is, in 1997. DIT has almost 4000 students with about 60 per cent of them study part-time. It is establishing ICT technician programs with help from Sida, which is supporting the development and implementation of vocational ICT courses in cooperation with the Ministry of Communication and Transport. The Ministry concluded that the lack of ICT professionals could slow the development of the ICT sector in Tanzania and a consultant appointed by Sida confirmed the need for training programs for ICT professionals, technicians and support staff level (Miller Esselaar and Associates, 2001).

Swedish support to the DIT is in the form of a grant to install internet-linked computer networks to enable the institute to train ICT technicians, a form of training not currently available in Tanzania. The training programs address the need for more people at Level 4 (i.e., ICT technicians and power users who can design websites, data bases, install telecommunications etc.) and fill the gap between lengthy Level 5/ professional engineer programs at the University and highly specialised courses available on the private market. Sida’s project objectives at DIT

are to support development of ICT vocational course programs; installation of networks, internet connectivity and computer labs at DIT; implementation of vocational courses, which will generate an increased number of ICT technicians available for the ICT sector; capacity building at DIT; and setting up computer facilities in the DIT library (Masika, 2002).

There are also technical colleges and teacher training colleges in various centres. Technical colleges, in particular, are ripe for delivering more ICT programs though poor infrastructure and a lack of funding make such a move dependent on international support. There is also a well-developed network of Vocational Education Training Centres and Folk Development Colleges, which may be appropriate for lower level (i.e., Level 3 – ICT users) ICT training. A graphic depiction of education pathways in Tanzania is provided in figure 4.1 below.

Figure 4.1 Education Pathways in Tanzania



Conclusions on education in Tanzania

Perhaps the most important resource any country has lies in the skills of its people. As economies become increasingly knowledge-dependent, it will be critical for Tanzanians to invest in education, particularly in sciences and English. Education can be both public and private sector driven but it is important to ensure that there are quality education and training spaces for qualified individuals from all socio-economic backgrounds. Increasing the quality of education, broadly, will aid in the establishment and growth of ICT in Tanzania. Overall, developments in ICT have far reaching implications for Tanzania’s economy but for this potential to be realised, the government, and international agencies, will need to make significant investments to harness and attract information technologies products and services. The role of the private sector is also important and the regulatory environment credit markets need to adapt to this emerging force (Mpungwe, 2002).

Recommendations

The end result of this research is a set of recommendations to support the development of ICT education in Tanzania. Lessons learned from the Swedish experience were applied in a manner that recognized the conditions and constraints in Sida partner countries. *The vast majority of those interviewed in Tanzania expressed the need for more, and higher quality, ICT training in the country.* Previous reports commissioned by Sida have also

arrived at this conclusion (Lamtrac, 2001; and Miller Esselaar and Associates, 2001). It is therefore recommended that Sida support the development of a program to develop ICT skills in Tanzania. Such a program might include the following components:

4. Train the trainer;
5. Three ICT technician streams; and
6. ICT for government managers.

The Swedish experience shows that it is possible to increase ICT competency among those without the highest levels of education. It also underscores the value of a decentralized approach where training is organized and delivered at a regional level. However, Swedish successes such as *Kunskapslyftet* (the Adult Education Initiative), SwIT³⁹ (Sweden Information Technology Vocational Training) and KY (*Kvalificerad Yrkesutbildning* – Advanced Vocational Education)⁴⁰ are difficult to export, “lock-stock-and-barrel,” to Tanzania because of financial constraints and different socio-political environments. Indeed, *Kunskapslyftet* focuses on adults with low levels of education while the SwIT program targeted unemployed adults. In Tanzania, on the other hand, there is a huge population of graduates from secondary and upper secondary school without solid employment prospects. Although this group is among the top ten per cent of the country in terms of educational attainment, their success can stimulate economic growth and social development in the country as a whole. Indeed, such an approach may be warranted given recent reports concluding that amid poverty, development assistance in LDCs should aim to increase overall economic growth, rather than concentrating only on the poorest people (UNCTAD, 2002).

Therefore, it is suggested that key lessons from the Swedish experience (e.g., affordable access, focusing on developing non-university level ICT skills, decentralized delivery, use of work-based training etc.) be incorporated into programs developed to support ICT skill development in Tanzania. At the same time, it is recognized that an approach focusing on adults with low skills levels might defy market logic in a country where there are so many recent graduates without meaningful employment opportunities. Moreover, these recommendations are not only centred on Dar es Salaam (Tanzania’s only major urban centre) but seek to address countrywide needs, taking into account facilities outside Dar and alternate delivery systems.

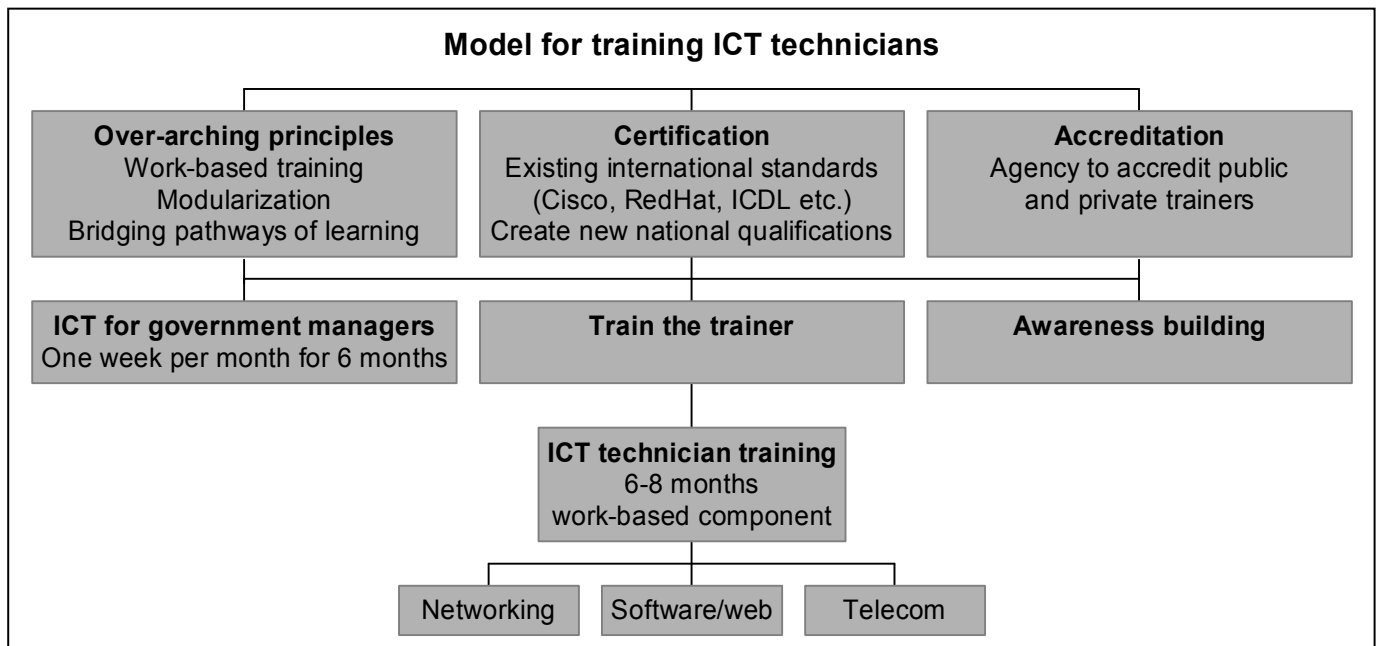
Given the abundance of unemployed secondary, upper secondary and college and university graduates, it is recommended that ICT training be targeted to these groups. Although there are concerns about focusing limited resources on the best-educated people in the country, it is felt that this approach would be most successful, and best able to meet immediate industry and government demands. Moreover, clearing labour supply bottlenecks will benefit the entire country by stimulating economic growth and desperately needed government revenues.

³⁹ Whereas *Kunskapslyftet* focuses on individual needs, programs such as SwIT, and to a lesser extent KY, are geared to meeting industry needs for skills. SwIT was designed to clear a labour supply bottleneck that was restricting ICT sector growth in Sweden. A similar approach could be used to address skills shortages in Tanzania, with the added attraction that Swedish principles of access could open the training to qualified individuals who would otherwise not be able to afford ICT training.

⁴⁰ Table 2.9 in the chapter on Sweden provides a quick overview of these programs.

A model for training ICT technicians is illustrated below in figure 4.2. Details of the various components of the model are provided in following pages.

Figure 4.2 Model for training ICT technicians in Tanzania



1. Train the trainer

There is a serious shortage of qualified ICT trainers in Tanzania. This is compounded by the loss of instructors in public training institutions to higher paying opportunities in the private sector. To meet high demand for ICT training, many private training providers are importing trainers from India, with a consequent increase in training costs and missed opportunity to further develop human resources in Tanzania. Therefore, in order to develop a large-scale program to train ICT technicians in Tanzania it will be necessary to first develop a program to train Tanzanians to serve as ICT trainers.

Depending on the magnitude of Sida’s program to support ICT training in Tanzania, a concerted “train the trainer” initiative may be required, perhaps in several locations across the country. Initial centres for such training may be the Dar es Salaam Institute of Technology (DIT) and/or the University Computing Centre (UCC) in Dar es Salaam. The new Vocational Education Training Authority (VETA) instructor-training centre in Morogoro, a modern centre recently equipped with assistance from Sida, may also be an appropriate location for a train the trainer program. Further a field, the Technical Training Colleges in Mbeya and Arusha, and UCC centres in Arusha and Dodoma, may all have the capacity to undertake train the trainer initiatives.

2. Training ICT technicians

In many countries there is a critical shortage of ICT technicians and reports have documented this human resource deficiency in Tanzania. Although there is a modest capacity to train ICT professionals at the university level, *there is a very limited supply of quality training for ICT technicians*. Moreover, the ICT technician training that is currently available in

Tanzania is mainly delivered by private, for profit training institutes with variable, and often questionable, quality and very high tuition fees. Sida has supported an expansion of quality training capacity through the DIT and this could serve as a springboard for further initiatives in the country.

Three technical streams, one hybrid tech-manager

It is recommended that Sida support a training regime that supports the development of ICT technicians in the following sub-areas:

4. Networking;
5. Software and web technicians; and
6. Telecommunication technicians.

The three sub-fields would share certain components, or modules, to achieve training efficiency and impart core competencies. Shared modules would include some technical ones as well as common “soft skills” modules. These should include training in interpersonal skills, management and other skills that help graduates lead the implementation of ICT in government and industry.

Further research is needed to determine the exact length of these training programs but most people interviewed suggest a technical training period of approximately six months combined with six to eight weeks of work-based training.⁴¹ Overall, technical training streams could last anywhere from six to eight months. It is recommended that specific lessons learned from SwIT and KY be applied before supporting the development of training programs in Tanzania. The resulting knowledge transfer would increase the effectiveness of a program to train ICT technicians in Tanzania.

3. ICT for government managers

It is important to build awareness of the benefits of ICT among the highest levels of government. At present, the use of ICT is not being driven from the top in Tanzania and any attempt to address government efficiency through the use of ICT may ultimately fail if senior managers do not appreciate its utility. Once they do, they will influence their managers and ICT will spread throughout government. This is related to “Political e-Readiness.” The lack of awareness of the utility of ICT in developing countries remains its biggest stumbling block. Government department budgets are sufficient to fund training and purchase and maintenance of equipment but decision makers do not yet appreciate the benefits. At present, government efficiency in Tanzania is hampered by not only a lack of computers but also by a lack of ICT skills among government employees. Indeed, during visits to Ministries it appeared most computers were not used at all.

Therefore, in order to increase the efficiency, responsiveness and transparency of government, it is proposed to support development of a program to train managers in government to both utilize and, more importantly, support and guide the implementation of ICT in government. It is recommended that managers from both central government ministries and agencies *and* local government officials (i.e., key district

⁴¹ The SwIT program also used the six-month training period. SwIT's feasibility study showed that it was possible during a period of 25 weeks to train people sufficiently well to give them knowledge that was up-to-date and met industry needs.

and municipal staff) be selected to participate in this training. This training should be aligned with the development of Tanzania's e-Government policy currently being developed.

Unlike the full-time training offered for train the trainer and the three technicians streams, it is suggested that ICT for government managers rotate between four groups concurrently, perhaps with each group participating in one-week sessions every month over a period of four to eight months. A suggested location for ICT training for central government managers is the Tanzania Global Development Learning Center (GDLN), a high quality facility established with World Bank funding in central Dar es Salaam. Key government officials have confirmed that the GDLN would be an appropriate facility for ICT training for government managers, even at senior levels. Use of the GDLN would also allow Sida to leverage its development assistance with previous assistance provided by the World Bank. ICT training for local government managers might best be offered in the regions, perhaps at facilities used for train the trainer or, alternatively, at institutions used for the ICT technician streams.

4. Certification and accreditation

ICT is an emerging and dynamic field without a large number of established, certified training programs. Moreover, the various branches of the emergent ICT industry are largely unorganized and have difficulty articulating core competencies required for both technical and professional staff. This challenge is similar in Sweden and Tanzania.

It is therefore recommended that Sida support a national accreditation and certification process in Tanzania, either through the National Council for Technical Education (NACTE) or through the Vocational Education Training Authority (VETA). Both bodies are authorised to grant credentials and could serve as national standards bodies to ensure quality throughout the country and across different training centres. This would address concerns raised about the quality of ICT training as well as create a reliable standard that would be recognized throughout Tanzania. It is further recommended that the certification and accreditation body organize admissions to the overall program to ensure a transparent and fair admissions process. This would be especially important if the program is offered with subsidized tuition to ensure reasonably broad access across the socio-economic spectrum.

Awareness Building

Several officials interviewed in Tanzania suggested that building awareness of ICT in Tanzania would be beneficial. This would also address the recommendation to increase awareness of ICT in Tanzania expressed in the Lamtrac report (Lamtrac, 2001:17). Such an initiative could precede, or run concurrent to, a larger ICT technician training program. A program could be geared to the general public (e.g., through a television program as suggested in the Lamtrac report) or could be focused on government employees to facilitate adoption of ICT to improve efficiency and transparency.

Kunskapslyftet comes to Tanzania

It may be possible to spread ICT even further and wider in Tanzania by supporting lower level ICT training. Such training could be delivered through the Folk Development Colleges (FDCs). The Folk Development Colleges were established in the 1970s to give skills and knowledge to adults to help them contribute to the rapid modernization of the country. The colleges are residential, but also run outreach courses in the surrounding villages. In total, there are 58 FDCs located all over the country. They were inspired by the Swedish experience with Folk High Schools. Although the colleges are under the jurisdiction of the Ministry of Community Development, Women Affairs and Children, they have significant autonomy and are essentially locally controlled. FDCs also have very democratic structures but they lack teaching resources as well as the infrastructure to engage in ICT training.

Modules developed for the ICT program proposed above could be exported to a broader, more democratic ICT training and awareness initiative in the future. *However, it is recommended that Sida first support a program to meet industry needs for ICT technicians that would, in turn, support both economic growth and better governance in Tanzania.* Therefore, any more local initiatives, such as delivering basic ICT training through FDCs, should follow a more focused program to train ICT trainers, technicians and government managers.⁴² In the future, however, a more locally based approach might provide good opportunities for ICT technician graduates to “spread” ICT skills throughout the country and help implement simple ICT solutions to, for example, increase the efficiency of agricultural activities.

⁴² Therefore, a suggested timeline of intervention might start with train the trainer before moving to technician training, ICT for government managers and then a more popular program for people in rural areas through FDCs or community telecentres.

Bibliography and interviews

Arbetsmarknadsstyrelsen (AMS) (The Swedish Labour Market Board), *Kvarstående arbetslösa och i konjunkturberoende program Årsmedeltal*, Stockholm: AMS, 2001.

AMS, *Sweden's Employment Service – organisation and activities*, AMS, March, 2001b.

AVE (Kvalificerad Yrkesutbildning) (2002), *www.ky.se*.

Bell, Richard (2002), "Halfway proposition – a strategy for reducing Africa's international internet costs," *http://www.balancingact-africa.com*.

Boudard, Emmanuel (2001) *Literacy proficiency, earnings, and recurrent training: a ten country comparison*, Studies in comparative and international education 57, Stockholm: Institute of International Education.

Canadian International Development Agency – CIDA (1998) *Tanzania Programing Framework*. Ottawa: CIDA.

Carr-Hill, Roy A., Kweka, A.N., Chengelala, Rustica and Rusimbi, Mary (1990) "The functioning and effects of the Tanzanian literacy program: summary," Paris: International Institute for Educational Planning.

Center for International Development at Harvard University (2002) *Global Information Technology Report: Readiness for the Networked World*.

Central Bank of Sri Lanka (2001) *Annual Report of the Monetary Board to the Hon Minister of Finance For the Year 2001*. Colombo: Central Bank Printing Press.

Central Bank of Sri Lanka (2002). *Recent Economic Developments Highlights*. Colombo: Central bank of Sri Lanka, March.

CIA (2002) The World Fact Book — Sri Lanka. *http://www.cia.gov/cia/publications/factbook/geos/ce.html*

Council for Information technology (2001) National Policy on Information Technology. Ministry of Higher Education and Information Technology Development, Colombo.

CyberConcepts Pvt (2001) Establishment of Multimedia Technology Training & Development Centre Supplementary Study for JICA Office Sri Lanka. September.

- Dominic, David (2000) FITIS Sri Lanka and the IT Industry, Colombo: Federation of the Information Technology Industry.
- e-Sri Lanka (2002) *An ICT Development Roadmap. Building Success Through Action* (document prepared for the Ministry of Economic Reform, Science, and Technology, and is based on extensive consultation including with international agencies) July.
- ECDL Foundation (1999) European Computer Driving License Syllabus.
- Embassy of Sweden, Dar es Salaam (2000) "Tanzania 2000: Macroeconomic developments and the 2000/2001 budget," Memo, 29 June, Dar es Salaam: Embassy of Sweden.
- Greenberg, Alan (2002) Country ICT survey for Sri Lanka prepared by Greenberg ICT Services for Sida, May 2002.
- Greenberg ICT Services (2002) "Evaluation of ICT projects at universities and research organizations in Sri Lanka," Montreal: Prepared under contract to Sida, September.
- HakiElimu (2001) *Promoting public participation in education governance*, Dar es Salaam: HakiElimu Tanzania.
- Harris, Jerry (2001) "Information Technology and Global Class Formation," paper submitted for the First International Conference of the Global Studies Association
Manchester Metropolitan University, July, 2001.
- Hedén, Ylva (2001) *Hur har Kunskapslyftet påverkat Komvux? Jämförelse mellan kommunerna*, Inregia AB på uppdrag av Skolverket Juli.
- Ilshammar, Lars (2000) "Sweden as an IT nation" *Current Sweden*, Stockholm: Swedish Institute no. 430, July.
- IFAU – Institute for Labour Market Policy Evaluation (IFAU) (2002) "A study of vocational labour market training," <http://www.ifau.se>
- Institute for Management of Information Systems (2002) What are the Skills in Demand: notes for those planning courses.
- Kinunda, M, Mmari, G, Robinson, T and Sarvi J (1999) *Tanzania education sector development program (ESDP): appraisal March 1999*, Appraisal coordination team final report, Dar es Salaam: Ministry of Education.
- Kolouh, Lidija (1993) *Education for self-reliance in Tanzania*, Stockholm: Institute of International Education, Stockholms universitet.
- Lamtrac AB, (2001) "Survey of the need for a vocational training program for ICT professionals in Tanzania," Final Report, January 2001, Stockholm: www.lamtrac.se.
- Lind, Agneta and McNab, Chistine (2000) "Rethinking educational aid, sector-wide approach to education: views from Sida," in *Prospects*, vol. XXX, no. 4, December 2000.
- Little, Angela W. (1999) *Labouring to learn: towards a political economy of plantations, people and education in Sri Lanka*, London: MacMillan Press Ltd.

- Mallya, Ernest T. (2001) "A Critical Look at Tanzania's Development Vision 2025," <http://unpan1.un.org/intradoc/groups/public/documents/idep/unpan002404.pdf>.
- Mendis, P. (2001) Daily News, Tuesday June 12, 2001, "Lanka Needs 25,000 IT Professionals in the Next Three Years.
- Miller Esselaar and Associates (2001) *A country ICT survey for Tanzania*, Stockholm, Swedish International Development Cooperation Agency.
- Ministry of Education (2002) "Education in Tanzania," Dar es Salaam: <http://www.tanzania.go.tz/educationf.html>.
- Ministry of Employment and Labour (2002) *Draft National Employment Policy for Sri Lanka*. May 2002 (sponsored by the Royal Norwegian Government).
- Ministry of Education and Culture (1995), *Education and Training Policy*, Dar es Salaam: Mzumbe Book Project.
- Ministry of Education and Higher Education (2001) *School Census 2001 Preliminary Report*. Colombo, Statistical Branch Sri Lanka. November.
- Ministry of Education and Higher Education (2002) National Policy on Information Technology in School Education. Information Technology Unit, Colombo.
- Ministry of Education and Science (1999) *The Adult Education Initiative, A unique program for adult education*, Stockholm: Commission for the Adult Education Initiative, Ministry of Education and Science.
- Ministry of Industry, Employment and Communications (2000a) *The development of IT skills*, Stockholm: Ds 2000.076
- Ministry of Industry, Employment and Communications (2000b) *IT – an engine for growth*, Stockholm: Ds 2000:68:
- Ministry of Science, Technology and Higher Education (1996) *Technical, education and training policy*, Dar es Salaam: Dar es Salaam University Press.
- Ministry of Science, Technology and Higher Education (2002) *Some basic statistics on higher learning institutions in Tanzania 1997/98 – 2001/2002*, Dar es Salaam: Dar es Salaam University Press.
- Ministry of Tertiary Education and Training (2002) News Release, August 15.
- Mmbaga, Dinah Richard (2002) *The inclusive classroom in Tanzania: dream or reality?* Studies in Comparative and International Education: 59, Stockholm: Institute of International Education.
- Morrisson, Christian (ed.) (2002) *Education and health expenditures and poverty reduction in East Africa: Madagascar and Tanzania*, Paris: Organization for Economic Co-operation and Development (OECD), Development Centre Studies.
- Mpungwe, Ami Ambassador (2002), Address to the Stakeholders' Workshop on the national ICT policy of Tanzania, Dar es Salaam.
- National Institute of Economic Research (NIER) (2000) *Service barometer for October*.

- National Training Standard for the occupation of Higher (2002). Advanced Diploma in Information and Communication Technology in the ICT Sector. May 2.
- Nnafie, Issmaol (2002) "Report of survey on internet cafes in Dar es Salaam," Eindhoven University of Technology, Faculty of Technology Management, Department of Technology Development Sciences.
- Nyerere, Julius (1968) *Ujamaa — essays on socialism*, Oxford: Oxford University Press.
- NUTEK (1999) *Conditions for the Development of New Ways of Working and Electronic Commerce in Sweden*, Stockholm: NUTEK.
- Organization for Economic Co-operation and Development (OECD) (1998) *OECD Economic Surveys: Sweden, 1998*. Paris: OECD, February.
- OECD (1999) *OECD Employment Outlook June 1999*. Paris: OECD.
- OECD (2000) *Education at a Glance: 2000 edition*. Paris: OECD.
- OECD, OECD Employment Outlook June 2001, Paris: OECD, 2001.
- Odero, Jared (2002) ICT-Based Flexible Higher Education (The Swedish Liberal Adult Education Model), Paper presented at the New Educational Benefits of ICT in Higher Education Conference held in Rotterdam 2–4 September, 2002.
- Oxfam (2002), "Education Now: Tanzania no longer free," <http://www.oxfam.org.uk/educationnow/tanzania.htm>
- Oxfam (2002b) "Debt for poverty reduction: the case of education in Tanzania — The state of education in Tanzania" <http://www.caa.org.au/oxfam/advocacy/tanzdebt/education.html>
- Rieper, Olaf and Toulemonde, Jacques (1997) *Politics and practices of intergovernmental evaluation*, New Brunswick, NJ: Transaction publishers.
- Rubenson, Kjell and Xu, G. (1997) "Barriers to participation in adult education and training: towards a new understanding," in P. Belanger and A.C. Tuijnman (eds.) *New patterns of adult learning: a six-country comparative study*, Oxford: Pergamon Press.
- Rubenson, K., Tuijnman, A.C., and Wahlgren, B. (1999). *Från Kunskapslyftet till en Strategi för Livslångt Lärande: Ett perspektiv på svensk vuxenutbildningspolitik*. SOU 1999:141. Stockholm: Regeringskansliet and Ministry of Education and Science.
- Samaranayake, V.K. (2002) "Human Resource Development in IT-A Case Study of Some Innovative Initiatives from Sri Lanka," unpublished paper.
- Samaranayake, V.K. (2002) "An Overview of Human Resources-Needs, Availability, and Plans for the Future," Colombo.
- Sianesi, Barbara, "An Evaluation of the Active Labour Market Programs in Sweden," Office of Labour Market policy Evaluation (IFAU), Uppsala: Working paper 2001–5, 2001.

- School Information Technology Education in Sri Lankan Government Schools (2001) Master Plan 2001–2007.
- Skolverket – National Agency of Education (1999) *The Adult Education Initiative: An overall investment in adult education*, Stockholm: Skolverket.
- Skolverket (2001) *Kunskapslyftet och den gymnasiala vuxenutbildningen Våren 2001*, Stockholm: Delrapport nr 9. Dnr 00:1671.
- SOU – Statens offentliga utredningar (1999:39). *Vuxenutbildning för alla? Andra året med Kunskapslyftet*. Stockholm: Regeringskansliet.
- SOU (2000:28). *Kunskapsbygget 2000 – Det Livslånga Lärandet*. Stockholm: Regeringskansliet, 2000:28.
- SOU (1999) “*Utvärderingen av KY*”. *Rapport fram en forskargrupp Lueå 1999*. Stockholm: Regeringskansliet, 1999:119
- SCB – Statistiska centralbyrån (2001) *Sweden 2000: a knowledge society*, <http://www.scb.se/eng/publikat/utbildning/utbildning.asp>.
- SCB (2002) *Befolkningens studiedeltagande*, http://www.scb.se/sm/UF79SM0201_tabeller1.asp
- Stenberg, Anders (2002) “Adult Comprehensive Education for the Unemployed as an Alternative to Labour Market Training,” Preliminary version of thesis, July 2002.
- Swedish Information Technology (SwIT) (2002) “SwIT training for jobs in information technology created a platform for growth,” <http://www.swit.org>.
- Swedish International Development Cooperation Agency (Sida) (2000). *Sweden and Tanzania*, Stockholm: Sida.
- Swedish Institute (2001) *Compulsory schooling in Sweden*, Fact Sheets on Sweden June 2001, FS 39, Stockholm: Swedish Institute.
- Swedish Institute (2001b) *Upper secondary and adult education in Sweden*, Fact Sheets on Sweden June 2001, FS 64, Stockholm: Swedish Institute.
- Söderström, Hans (1997) “Policies for Knowledge-based Employment and Growth: Five Critical Issues,” <http://www.usis.usemb.se/Publications/jobcreation/tsonsod.htm>
- Tanzania Commission for Science and Technology (COSTECH) (1998), *Priority areas of research and development in Tanzania*, Dar es Salaam: COSTECH.
- Tanzania Special (2002) *Tanzania Special – steady growth may be soured by TTCL dispute*, http://www.balancingact-africa.com/news/back/balancing-act_125.html.
- Tertiary and Vocational Education Commission (2001) National Training Standard for the occupation of Diploma in Information Communication Technologies in the Information and Communication Sector.
- Tistad, Per (ed.) (2001) *East Africa and Sweden: partners in progress*, Stockholm: NIR International Council of Swedish Industry.

Towards a Swedish Information Society for all, Report prepared for the conference stepping stones into the digital world (2000), Bremen, Germany, September 3rd 21–22, <http://www.digitale-chancen.de/transfer/downloads/MD42.pdf>.

Transforming Sri Lanka Through Information Communication Technology. 2002 action plan by the ICT Committee of the National Chamber of Commerce. February.

Transparency International (2002), *Transparency International Corruption Perceptions Index 2002*, www.transparency.org

Tuijnman, Albert (2001) “The advent of lifelong education policy in Sweden,” in Ministry of Education and Science, *Adult lifelong learning in a Europe of knowledge*, Stockholm: Government Printing Office.

Vocational Education and Training Plan for the Information Technology Sector

Computing Services Center (2001). Colombo: University of Colombo.

United Nations Conference on Trade and Development — UNCTAD (2002) *The Least Developed Countries Report 2002*, Geneva: UNCTAD.

United Nations Development Program — UNDP (2002) *Human Development Report 2002 – deepening democracy in a fragmented world*, Oxford: Oxford University Press.

United Nations Economic and the Social Commission for Asia and the Pacific (2001) *Narrowing the Digital Divide in Sri Lanka and providing equal access to Information and Communication Technology*. Champa Waragoda. Deputy Director, Compliance. TRC Telecommunications Regulatory Commission of Sri Lanka, December 19

United Nations Educational, Scientific and Cultural Organization – UNESCO (2002) *Education for all, an achievable vision*, Paris: UNESCO, www.unesco.org/education/efa.

United Republic of Tanzania (1996) *The Tanzania Development Vision 2025*. President’s Office, Planning and Privatization Commission, Dar Es Salaam: The United Republic of Tanzania, <http://www.tzonline.org/pdf/theTanzaniadevelopmentvision.pdf>.

U.S. Department of Education, *International Adult Literacy Survey: Benchmarking Adult Education in America: An International Comparative Survey*, Jessup, MD: Education Publications Center, September 2000.

World Bank (2002) *Achieving Education for All by 2015: simulation results for 47 low-income countries*, Washington, DC: Human Development Network, Africa region and Education Department, April.

Yonah, Zaipuna (2002) Building infrastructure for ICT development in Tanzania, Dar es Salaam: National Stakeholders’ Workshop on National ICT Policy Held at the Royal Palm Hotel, Dar es Salaam; 25th May 2002.

Interviews

Sri Lanka

Professor Samaranayake

Director, University of Colombo School of Computing (UCSC)

Mr. Mudiyansele Herath Sirisena

Ministry of Education and Higher Education

Deputy Director General of Education

D. Sumithraarachchi

Project Director

Science and Technology Personnel Development Project

Asian Development Bank

Mr. J. Abeywickrema

Ministry of Labour Additional Sec. Ministry of Labour Secretariat

Mr. A. Chandrapala

Additional Secretary

Ministry of Education and Higher Education

P. Wijesiri, Gunasekara

Education Management Consultant

Dr. Harsha Liyanake

Deputy Executive Director

Sarvodaya

K. Romeshun

Program Officer

Embassy of Sweden

Ajith Ekanayake

Director

Council for Information Technology

Aruni Goonetilleke

Assistant Director

Council for Information Technology

Devika Nandane Rodrigo

Deputy Director (Planning & Research)

Tertiary and Vocational Education Commission

Mr. Kithsiri Manchanayake
President
ACTOS (The Association of Computer Training Organizations)

Professor L. Ratnayake
Vice-Chairman
University Grants Commission

Mr. Senaratne
Project Director
Skills Development Project

David Dominic
Executive Director, Infotel, (Federation of Information Technology)

P. Leelaratne
Additional Secretary
VET Policy and Planning
Ministry of Tertiary Education and Training

D. Dissanayake
Director, Informations Systems
Tertiary and Vocational Education Commission

W. De Silva
Director
Tertiary and Vocational Education Commission

Harsha Aturupane
Senior Economist
The World Bank

Wijaya Jayatilaka
Director
Sri Lanka Foundation Institute

School Visit
National Automotive Institute of Training

Sweden

Anita Barger
Project Leader for Kunskapslyftet, Skolverket
July 16, 2002.

Sven Eriksson
Advisor (AVE), Ministry of Education
July 4, 2002.

Dan Fagerlund
Advisor, Ministry of Education
July 9, 2002.

Lennart Fridén
Consultant, Inregia AB,
July 11, 2002.

Henrik Hansson
Net University and Stockholm University
Nov 19, 2002

Tomas Kjellkvist
Sida/SAREC
July 25, 2002

Victor Millqvist
Senior consultant, Sipu International
June 27, 2002.

Åsa Sollman
Director, Ministry of Industry, Employment and Communications
June 19, 2002.

Petra Smitmanis Dry
Sida
August 8, 2002

Anders Stenberg
Department of Economic, Umeå University
June 27, 2002

Kerstin Thun
Kornboden AB
October 15, 2002

Per-Einar Tröften
Sida/ICT for Development Secretariat
September 27, 2002

Tanzania

Commission of Science and Technology (COSTECH)
September 5, 2002
Theophilus E. Mlaki, 0744-323597
P. Kilassa, Principle Scientific Officer (IT Training Coordinator)

Distance Learning and Education Services (DILES)
August 22, 2002
Omar Mzee, Director, 2126284, info@distancelearning-tz.org

Dar es Salaam Institute of Technology (DIT)
September 3, 2002
Professor J. Kondoro, Principal, Tel +255-22-2150174
Dr. Richard J. Masika, Vice Principal and Director of Studies, Tel +255-22-215 2292
Gregory R. Lushaka, Principal Instructor/HOD Computer
Mathew Mburuma

HakiElimu
September 6, 2002
Rakash Rajani

Infotech Investment Group LTD (Dar es Salaam)
August 22, 2002
Ali A. Mufuruki, Chairman and CEO, Infotech Investment Group LTD

International Institute for Communication and Development (IICD)
August 21, 2002
Thomas Matthew

Ministry of Communications and Transport

September 4, 2002

August Kowero, Director,

Ministry of Education and Culture

August 19, 20 and 21, 2002

Mr. Mwaimu, Policy and Planning, Tel 0744-307022

Mr. D.L. Mallya, Projects branch

Ms. H.M. Maggid, Research branch

Ms. M.J.N. Mongella, Head, Projects branch

Ms Assela M. Luena, Ministry of Education

Mr. Hudson D. Manasambungu, Statistics Unit

Ministry of Science, Technology and Higher Education

September 5, 2002

Mr. S. Mmwiry, Director, Technical Education, +255-22-2667406, Mob 0744-282298

Mr. Mdemu, Director, Planning

Mr. Mbegu, Director, Higher Education (afternoon)

National Council for Technical Education (NACTE)

September 3, 2002

Mr. Joffer M. Maggila, Executive Secretary (*es@nactetz.org*), 0744-324293

Mr. Rutayuga, Seputy Secretary, Examinations

Mr. Timothy Manyaga, Deputy Secretary, Accreditation

Ms. Mbaki Onyango, Deputy Secretary, Information, Research and Development

Office of the President, Civil Service Department

September 4, 2002

David Sawe, Director, Management Information Systems

Swedish International Development and Cooperation Agency (Sida)

Christine McNab, August 7, 2002

Tomas Kjellkvist, July 26, 2002

Petra Smithmanis Dry, August 13, 2002

Per Einar Tröften, September 27, 2002

Sida – Embassy of Sweden (Dar es Salaam)

Ralph Kårhammer, Infrastructure Coordinator, August 6, 2002

Berit Rylander, Program Officer, Education, August 20, 2002

Sten Rylander, Ambassador, September 2, 2002

Nils Jensen, IT Coordinator, September 2, 3, 4, 5 and 6, 2002

Ann Stödborg, Sida Head, September 5, 2002

Tanzania Communications Commission (TCC)

September 5, 2002 (morning)

Col. Abihundi N. Nalingigwa, Director General

Goodluck J.S. Ole Medeye, Director, Finance and Administration

⁴³ Inaugurated in 1978, the main objective of the college is to train technicians to the level of Full Technician Certificate. The college has a capacity of 471 students. Main areas of training are in the fields of automotive, civil, electrical, highway and mechanical engineering. The college draws students from with a technical or science bias and do well in O-level exams. Selection of students is administered by the Ministry of Science, Technology and Higher Education in collaboration with Ministry of Education and Culture. The college also offers part time courses such as computer skills, technical secondary education, auto mechanics, machine shop technology and electrical installation.

Tanzania Global Development Learning Center (GDLN)

August 20, 2002

Charles Senkondo, Director

Technical College of Arusha⁴³

August 27, 2002 (Site visit)

D.M.Mbosoli, Principal, Tel 255-0272503040, <http://tca.habari.co.tz>

Techno Brain Ltd.

September 5, 2002

Manoj Shanker, General Manager, Tel 022-211-3502

United Nations Development Program (UNDP)

September 4, 2002 (evening)

Riku Asikainen, ICT Coordinator

University Computing Centre Ltd. (UCC)

September, 2 (afternoon)

Professor Beda Mutagahywa,

UCC – Arusha

August 28, 2002 (site visit)

University computing Centre

Arusha Information Technology Training Centre

arusha@ucdsm.ac.tz. Tel. 255-027-2509469

University of Dar es Salaam (UDSM)

September, 2 (morning)

Professor Matthew Luhanga, Vice Chancellor

Vocational Education and Training Authority of Tanzania (VETA)

September 5, 2002

Dr. A. Meru, Director General, +255-22-2863683, 0744-299494,

veta@raha.com

Mr. A. Athumani, Senior Advisor, Vocation Training

Appendix 1

Abbreviations

ADB	Asian Development Bank
AISPs	African Internet Backbones
AMI	Employability Institutes
AMS	<i>Arbetsmarknadsstyrelsen</i> (National Labour Market Authority)
AMU	Labour Market Training Agency
CIDA	Canadian International Development Agency
COSTECH	Tanzania Commission for Science and Technology
DIT	Dar es Salaam Institute of Technology
DTET	Department of Technical Education and Training
EFA	Education for All
ESAF	Enhanced Structural Adjustment Facility
ESR	Education for Self Reliance
FTE	Full-time equivalent
GDLC	Global Distance Learning Centre
GDP	Gross Domestic Product
HRDC	Human Resources Development Committee
IALS	The International Adult Literacy Survey
IBPs	International Backbone Providers
ICDL	International Computer Driving Licence
ICT	Information and communications technology
IFM	Institute of Finance Management
IICD	International Institute for Communication and Development
IMF	International Monetary Fund
JICA	Japan International Cooperation Agency
KY	<i>Kvalificerad yrkesutbildning</i> (Advanced Vocational Education)
KOMVUX	Municipal Adult Education
LDCs	Least developed countries
LO	<i>Landsorganisationen</i> (The Swedish Trade Union Federation)
NACTE	National Council for Technical Education (Tanzania)
NAITA	National Apprenticeship and Industrial Training Authority (Sri Lanka)
MDGs	Millennium Development Goals
NGOs	Non-governmental organizations
NITESL	National Institute of Technical Education of Sri Lanka

NYSC	National Youth Service Council (Sri Lanka)
OECD	Organization for Economic Co-operation and Development
OPEC	Organization of Petroleum Exporting Countries
PM	Prime Minister
PSLE	Primary School Leaving Exam
SAF	Structural Adjustment Facility
Sida	Swedish International Development Cooperation Agency
SFI	Swedish for Immigrants
SLCDL	Sri Lankan Computer Driving Licence
SSV	National Schools for Adults
TI	Transparency International
Tsh	Tanzanian Shilling
TTC	Tanzania Communications Commission
TTCL	Tanzanian Telecommunications Commission Limited
TVEC	Tertiary and Vocational Education Commission (Sri Lanka)
UCC	University Computing Centre (Dar es Salaam, Arusha, Mwanza, Dodoma)
UCSC	University of Colombo School of Computing
UDSM	University of Dar es Salaam
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPE	universal primary education
USD	United States Dollar
VETA	Vocational Education Training Authority (Tanzania)
VTA	Vocational Training Authority (Sri Lanka)

Halving poverty by 2015 is one of the greatest challenges of our time, requiring cooperation and sustainability. The partner countries are responsible for their own development. Sida provides resources and develops knowledge and expertise, making the world a richer place.



Sida

SWEDISH INTERNATIONAL
DEVELOPMENT COOPERATION AGENCY

SE-105 25 Stockholm Sweden
Phone: +46 (0)8 698 50 00
Fax: +46 (0)8 698 56 15
info@sida.se, www.sida.se