

# Constructing the knowledge base for knowledge-driven development

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## Keywords

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## Abstract

Information and communication technologies (ICTs) represent a major opportunity for world development. However, the "digital divide" is increasing rather than diminishing existing inequalities. This paper suggests several ways in which experiences with ICTs can be shared and in which more resources could be mobilised to support local ICT projects and locally-defined goals. The activities of the Commonwealth's agencies in this area are used to provide illustrations of a variety of initiatives. It is argued that strategic action on the part of agencies within their own organisations and in co-operation with others is likely to help to facilitate the process of constructing a stronger knowledge base for knowledge-driven development, but that there is no room for complacency. In addition to improved co-ordination and co-operation, effort is needed to focus on the purposes and goals of knowledge-driven development, rather than on the short-term interests of individual stakeholder organisations.

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## Introduction

The accelerated development of information and communication technologies (ICTs) in the decades of the 1980s and 1990s and in the early part of the twenty-first century is one of the principal factors affecting economic, social, and political processes across the globe. The massive increase in computer processing power that is becoming available to hundreds of millions of users, the development of powerful networks for linking individual computers, and the digital convergence of information and image flows are transforming the knowledge and social and economic environment in many countries and, potentially, in all.

ICTs represent a major opportunity for world development. However, this is an opportunity that must be promoted in full awareness of the risk that the benefits will be unevenly shared. This risk has come to be known as the "digital divide". If the opportunities offered by digital technologies are harnessed, however, they can help to achieve sustainable development and contribute to the deepening of democracy through the empowerment of individuals and improved governance.

The development and use of ICTs can empower individuals in the sense that there are new opportunities for people to do the things that they choose to do through, for example, the use of the Internet and mobile communications. Many purposes for information exchanges and communication have yet to be imagined by private sector developers or by governments and members of civil society. Although there are risks of negative consequences, the positive opportunities have barely been tapped.

The "digital divide" manifests itself on many levels, both within countries (dividing one business, region, or social group from another) and between countries (affecting the ability of some countries to participate in the development and market growth that others

This article highlights some of the views presented in Commonwealth Secretariat (2001), a report which was prepared in part by the author under contract to the Secretariat. The views expressed in the present article are entirely those of the author and do not reflect those of the Secretariat or any other organisation. The introduction to the article is based in part on a contribution by Dr Nick Couldry, LSE, to the earlier report.



enjoy). But however it manifests itself, there is a risk that various aspects of "digital divides" will increase rather than diminish existing inequalities. Within the widest sense of the digital opportunities for knowledge-driven development, this concern is being addressed through numerous initiatives that aim to construct a strengthened knowledge base for knowledge-driven development processes.

By facilitating international networks through which experiences with ICTs can be shared, it may be feasible to mobilise more resources to support local ICT projects that assist in improving the knowledge management process in support of locally-defined goals. This article highlights the way in which one group of agencies, the Commonwealth group of agencies, is seeking to make a contribution in this area (see Commonwealth Secretariat, 2001; Commonwealth Telecommunication Organisation, 2001a).

## Global networks and the digital divide

ICTs are enabling and potentially empowering. When ICTs are accessible and affordable, and designed to support specific needs for analysing, storing and exchanging information, they can enable people to accomplish tasks that otherwise would be too costly or impossible without them. The wealthy countries are rapidly devising ways of reaping the benefits of digital technologies and the expansion of global networks. Investment in ICTs can create opportunities for promoting sustainable development and for deepening democratic practices. These opportunities arise as a result of the increasing convergence between telecommunication, broadcasting, and information technologies (including computer hardware and software). Unfortunately, however, the "digital divide" means there is a very substantial risk that those without the capacities to access ICTs or to use them effectively will be further marginalised. The risks and opportunities associated with ICTs co-exist as a consequence of a "revolution" in networking. Many argue that both social and technical networks need to be given greater priority in the development effort in order to facilitate information exchanges and knowledge sharing (Mansell and Steinmueller, 2002; Mansell, 2002; Primo-Braga *et al.*, 2000).

The scale of the global "digital divide" is becoming familiar even to those who do not wish to give a very high priority to ICTs as compared to other important claims on investment for social and economic development. The magnitude of the gap in investment in the information infrastructures of the wealthy as compared to the lower income countries is suggested by the following. The OECD countries are estimated to be investing an average of about \$US116 per person in their information infrastructures, while the rest of the world is investing an average of only about \$US19 per person (OECD, 2001). Digital technologies including wireless (satellite and radio) offer the means for lower income countries to overcome barriers created by the lack of an adequate telecommunication infrastructure. In the light of the large variations between countries and within regions, the TeleCommons Development Group (2000) argues that:

... the division between what are and what are not appropriate ICTs for developing nations results in a distinction between those technologies advanced enough to transmit voice, data and video and those capable of voice-only transmissions ... each telecom environment is unique, and that *the choice of technical components must take into consideration the specific infrastructure, demographic conditions, organizational capacities, and policy contexts of the region* [emphasis added].

Acknowledging difference and distinctions is essential for the process of constructing a stronger knowledge base for knowledge-driven development (see Mansell and Wehn 1998).

The constraints to infrastructure development are not only related to ICTs. The lack of generally available and reliable electricity supply, especially in the villages of lower income countries is also a major problem in establishing network connectivity. Although cost savings associated with the use of new digital technologies can often be achieved, as the UN Human Development Report (UNDP, 1999) notes, it should not be assumed that the presence of a network and computers means that ICTs are accessible for the majority of potential users. Cultural, gender, and institutional issues present barriers to access. In addition, the prices paid by businesses and citizens for Internet access are prohibitively high in many lower income countries as shown in Table I.

**Table I** Monthly Internet access prices in selected OECD and African countries

	US\$	As % of GDP per capita
<i>OECD</i>		
<i>Mexico</i>	94	14.8
<i>Turkey</i>	65	12.8
<i>Japan</i>	50	2.6
<i>Finland</i>	33	2.2
<i>United States</i>	29	1.2
<i>Australia</i>	24	1.5
<i>Africa</i>		
<i>Uganda</i>	92	107.0
<i>Guinea</i>	65	45.3
<i>Sierra Leone</i>	50	118.0
<i>Ethiopia</i>	32	76.8
<i>Mozambique</i>	29	69.6
<i>Senegal</i>	24	17.6

**Note:** These comparisons need to be interpreted with caution due to data reliability problems and variations over time

**Source:** Commonwealth Working Group on Electronic Commerce (2000)

The benefits of greater connectivity are often associated with increases in the supply of information and its circulation within social and business networks. But an unambiguous relationship between the scale of ICT investment within a country and its strengthened macro-economic performance is difficult to demonstrate. Examinations of this relationship mainly focus on aggregate statistical indicators and there is little consensus on how to construct a "knowledge" indicator for development (Mansell and Wehn, 1998; Rodriquez and Wilson, 2000).

Considerable attention is being given to creating new models for providing improved access to ICT applications and services in ways that have the potential to reduce the impact of the "digital divide". Tele-centre initiatives are offering new models for private and public investment as well as for public and private partnerships. When they are successful, they can contribute substantially to development goals by supporting community information sharing, citizen access to local and global communities, education delivery, business entrepreneurship, and specialised ICT training and training. The results of surveys of the viability of tele-centre initiatives in lower income countries are providing insights into the reasons for their success or failure (Espitia, 2001). The success of these centres

appears to depend upon their ability to provide services that are responsive to local demand, on the availability of external support, and on whether they are supported by associations involving local users. Benjamin (2001) found that in South Africa, for example, a major issue is whether sustainable commercial viability can be established. When it cannot be established, there is a need to consider what measures can be taken to offer public access at the lowest possible cost.

Human capabilities are as important, if not more important, than the ICTs. Strengthened capabilities are needed to establish policy and related institutions, to mobilise resources locally and globally through partnerships, to define information and communication needs, to develop ICT solutions that are relevant to those needs, and to incorporate new information into business and social practices in productive and socially beneficial ways. These capabilities are scarce resources worldwide and they are especially so in lower income countries.

There are numerous examples at the local, national and global levels of efforts to use ICTs to provide improved content and access to general education and ICT-specific skills training. Some initiatives are aimed at strengthening the education attainment levels of those who are marginalised and excluded from formal education and training institutions. Others are tailored to building a highly skilled workforce in areas that have been targeted by policy makers for economic development. There are many models for developing ICT-supported education and training (see Butcher, 2000; Commonwealth of Learning, 1999, 2001).

Although ICTs offer new opportunities for human resource development, there are constraints to the scale and scope of such initiatives. Copyright restrictions on the use of instructional products and materials can restrict information sharing. There are high upfront costs of implementing distance education and training programmes. The initial hardware, operating software, and instructional material often require funding that exceeds the resources of most institutions. Systems of support for learners are often not consistent with the demands of learning in virtual environments (Farrell *et al.*, 1999). Teachers may be reticent to embrace ICTs, educational philosophies may not be

consistent with interactive media, and there may be a preference for face-to-face learning when teachers and learners are given a choice. The major challenge is to select learning environments where the skills base can be enhanced throughout the population and this generally means an emphasis on the community context for learning.

The effective use of ICTs is also expected to offer opportunities for improved governance within knowledge-driven development contexts. There are many examples of the use of ICTs to develop e-government services and to support improved governance. For instance, in India an e-government or "Kerala" model is being developed using open source software (Parthapan, 2000). The Panchayat Level Information Network Project is using Linux as the operating system to support integrated information systems for agriculture, veterinary, school, and health information. Through automation and software applications using some proprietary systems, ICT use can help to reduce administration costs, reduce the cost of service provision, and open government to greater public oversight and accountability. For example, Andhra Pradesh was the first state in India to design a state-wide computerisation programme linking the largest and smallest government offices (Government of Andhra Pradesh, 2000).

In Singapore, the government is spending some \$US100 million annually on ICTs for the civil service to enhance decision making and public administration. For every dollar spent on this programme, it is estimated to have generated \$US2.70 in return due to increased productivity and reduced operational costs. Over 1,500 jobs are said to have been eliminated from the public payrolls, but an additional 3,500 jobs have been reoriented towards more productive outputs (Grace *et al.*, 2001). Canada is also playing a major role in stimulating the development of e-government by seeking to become a "model user" of ICTs (Canadian Information Highway Advisory Council, 1997).

However, the full potential of ICT to support e-government services remains unexploited. The consultancy firm, Accenture's (2001) survey of 22 mainly wealthy countries shows that the public sector lags behind the private sector in its use of the new technologies. The tendency for governments to lag behind the private sector

in making effective use of the potential of digital technology is only one of the constraints to effective use. E-government services may be under-utilised because they are technology-led. For instance, the introduction of an intranet system providing information on property ownership to staff and clients of the Johannesburg Metropolitan Council in South Africa was unused because it was not "needs focused" and training was inadequate (Grace *et al.*, 2001). Nevertheless, e-services are being successfully developed for automated customs clearance and electronic filing of export documentation, for instance, with the support of UNCTAD's Global Trade Point Network (Grace *et al.*, 2001). As Heeks (1998) argues, "IT on its own does not do anything useful; in order to do anything, it must become part of an information system; information systems do not necessarily involve computers and telecommunication equipment; even when they do, information systems are much more than just IT because they involve people and their actions".

### **Knowledge networking – mobilising investment and partnerships**

Digital technologies provide unprecedented means for aggregating, delivering and using information. Knowledge-driven development initiatives that make increasing use of digital technologies may create opportunities to develop knowledge networks to address a range of development-related problems. Software applications can provide information targeted to specific users. They can support the creation of profiles of user activities and interests, and they can facilitate searching for relevant content. They can be applied to create directories of people with similar interests and problem-solving experiences. ICT applications such as groupware, e-mail, document management, and search and retrieval systems can support individual and organisational activities and networks to foster strengthened communities of practice. They can enable mentoring and apprenticeship programmes and support the creative development of solutions to a variety of problems. Knowledge networking systems offer opportunities to reuse information, to share best practices, to support skills development and training, and to assist in problem-solving.

Despite the opportunities in this area, there are constraints. Information must not be

confused with knowledge. The management of digital sources of information must be linked to the development of communities of practice and embedded within distinctive organisational styles and politics. Software applications can provide sources of digital information, but such information must be applied in the context of users' experiences if it is to contribute relevant knowledge.

In the light of the potential of using ICTs to construct an enhanced knowledge base for development, and in the face of a "digital divide" that seems unlikely to be diminished as a result of purely market-led investment, there are numerous initiatives to mobilise investment and partnerships between all the stakeholders in the development process. For example, the G-8 Kyushu-Okinawa Summit in July 2000 issued the Okinawa Charter on the Global Information Society and established a Digital Opportunity Task Force (DOT Force) which reported to the G-8 countries in Genoa in July 2001 and an action programme is underway (DOT Force, 2001). The DOT Force is attempting to mobilise action that will contribute to bridging the digital divide, securing participation by non-members of the G-8 countries; and integrating ICT initiatives more firmly within development initiatives. The DOT Force stresses that there are "no one size fits all" policies and that simply knowing about best practices is insufficient to promote measures to address both the "digital opportunities" and the "digital divide".

The United Nations agencies, including the International Labour Organisation (ILO), the International Telecommunication Union (ITU), the UN Economic and Social Council (UNESCO), the United Nations Development Programme (UNDP), the UN Economic Commission for Africa (UNECA), and the UN Educational, Scientific and Cultural Organisation (UNESCO), are emphasising the importance of ICTs for development and they are taking steps to address the "digital divide". The Organisation for Economic Co-operation and Development (OECD) is seeking improved means of establishing dialogues with developing countries on policy frameworks for ICT use in areas such as e-commerce and e-government. The World Trade Organisation (WTO) and the World Intellectual Property Organisation (WIPO) are also focusing on the implications of the global spread of ICTs.

At the regional, national, and local levels, there are numerous initiatives as well. The Global Knowledge Partnership has initiated capacity building measures, information sharing and project co-ordination in the ICT area. The Global Information Infrastructure Commission is playing a role in fostering policies to advance the development of a global information infrastructure. The World Bank has put knowledge management at the centre of its strategies aimed at poverty reduction. There is a host of nationally-based government initiatives aimed at encouraging greater ICT development and use within countries and at enabling lower income countries to introduce initiatives.

A selection of initiatives that aim to support countries in building effective knowledge-driven strategies by taking advantage of the potential of digital technologies is listed below. In many of these initiatives a core issue is capacity building (Girardet, 2001b):

- Africa Connection – [www.africaconnection.org](http://www.africaconnection.org)
- Asia-Pacific Development Information Programme (APDIP) – [www.apdip.net](http://www.apdip.net)
- Association for Progressive Communications – [www.apc.org](http://www.apc.org)
- British Council [www.britishcouncil.org/index.htm](http://www.britishcouncil.org/index.htm)
- Canadian International Development Agency (CIDA) – [www.acdi-cida.gc.ca/INDEX-E.HTM](http://www.acdi-cida.gc.ca/INDEX-E.HTM)
- Canadian International Development Research Centre (IDRC) Acacia Programme, – [www.idrc.ca/acacia](http://www.idrc.ca/acacia)
- CISCO Networking Academy Program – [www.cisco.com/warp/public/779/edu/academy/](http://www.cisco.com/warp/public/779/edu/academy/)
- Department for International Development (DFID) UK – [www.dfid.gov.uk](http://www.dfid.gov.uk)
- Digital Partners – [www.digitaldivide.org/home.html](http://www.digitaldivide.org/home.html)
- DOT Force "Digital Opportunity Task Force – [www.dotforce.org](http://www.dotforce.org)
- Hewlett-Packard World e-inclusion program – [www.hp.com/e-inclusion](http://www.hp.com/e-inclusion)
- International Institute for Communication and Development – [www.iicd.org](http://www.iicd.org)
- International Labour Organization (ILO) – [www.ilo.org/](http://www.ilo.org/)
- International Telecommunication Union (ITU) – [www.itu.int/ti](http://www.itu.int/ti); [www.itu.int/ITU-D-TREG](http://www.itu.int/ITU-D-TREG)

- Markle Foundation – [www.markle.org/index.stm](http://www.markle.org/index.stm)
- Netaid.org – [www.netaid.org](http://www.netaid.org)
- OneWorld – [www.oneworld.net/campaigns/digitaldivide/index.html](http://www.oneworld.net/campaigns/digitaldivide/index.html)
- Organisation for Economic Co-operation and Development (OECD) – [www.oecd.org](http://www.oecd.org)
- The Global Knowledge Partnership (GKP) – [www.globalknowledge.org/gkaims.globalknowledge.org](http://www.globalknowledge.org/gkaims.globalknowledge.org)
- UN Educational, Cultural and Scientific Organization (UNESCO) – [www.unesco.org/webworld/index.shtml](http://www.unesco.org/webworld/index.shtml)
- United Nations Development Programme (UNDP) – [www.sdn.undp.org/it4dev/](http://www.sdn.undp.org/it4dev/)
- United Nations Economic Commission for Africa – Bridging the Information Gap in Africa – [www.uneca.org/programmes\\_home.htm](http://www.uneca.org/programmes_home.htm)
- USAID Leland Initiative – [www.usaid.gov/regions/afr/leland](http://www.usaid.gov/regions/afr/leland)
- World Bank Development Gateway – [www.development.gateway.org](http://www.development.gateway.org)
- World Bank Global Development Learning Network – [www.worldbank.org/gdln/](http://www.worldbank.org/gdln/)
- World Bank *infoDev* – [www.infodev.org](http://www.infodev.org)
- World Intellectual Property Organization – [ecommerce.wipo.int/index-eng.htm](http://ecommerce.wipo.int/index-eng.htm)

The Commonwealth constellation of agencies is involved in a substantial number of initiatives that complement those shown in the above list (see Commonwealth Secretariat, 2001). In order to extend the scale and scope of the Commonwealth's contribution to constructing a stronger knowledge base for knowledge-driven development, in September 2000, the Commonwealth High Level Review Group (HLG) constituted an Expert Group on Information Technology. The group drew upon evidence on the opportunities and constraints associated with the development and application of ICTs as tools for development. Its members were concerned to identify practical and deliverable targets for Commonwealth action. The Commonwealth agencies all have a commitment to democracy, good governance and sustainable development and many of these agencies have a capacity to share their experience and expertise. The Commonwealth agencies' membership cuts across the "North-South"

divide and its members have many successful examples of the adaptation of ICTs to meet development objectives.

As part of its work, the Expert Group drew on the results of a survey conducted by the Commonwealth Telecommunication Organisation (2001b) which elicited information about the priorities of Commonwealth governments in the ICT area and their views of priorities for the Commonwealth agencies. Table II lists some of the areas in which it was reported that Commonwealth governments have a role to play in addressing the "digital divide" and the areas where government respondents suggested that Commonwealth agencies can play a helpful role.

The lists in Table II are not ranked by order of importance because the priorities for countries and the Commonwealth agencies vary depending on their already existing strengths and the issues that they believe must be addressed most urgently. Nevertheless, the lists indicate that there are a large number of issues that could benefit from policy initiatives and the strategic consideration of measures to support the construction of a stronger knowledge base through the use of ICTs.

## Policy and strategic considerations

The development of policies and strategies to encourage ICT deployment must be embedded in and co-ordinated with social and economic development strategies. When ICT strategies are formulated without achieving this they generally become technology-driven and detached from the reality of the way people organise their social and economic lives. Policies and strategies must be connected with appropriate institutions and organisations if they are to have widespread support. There is also a very great need to achieve sustained investment in targeted areas. Many of the ICT pilot projects and experiments that are initiated raise user expectations. When these are not fulfilled, the result is resistance to the view that investment in ICTs should be given priority given competing demands for resources. Unused or poorly maintained information and communication systems create more – not fewer – problems for their users.

The work of the Commonwealth's Expert Group highlighted several essential issue areas

**Table II** Commonwealth selected key ICT priorities for Governments and Commonwealth agencies

Country ICT key priorities	Commonwealth ICT key priorities
Co-ordination, strategic planning and management	Assist member nations in management of structural adjustment
Develop human resources	Distance learning
Develop infrastructure	Encourage R&D in ICT
Diversification of supply of new technologies, radio	Facilitate policy dialogue
E-government applications	Formation of group to monitor IT and suggest measures for
Encourage competition	least developed countries, including affordable access
Facilitate private investment	Free Internet in schools
Frame legal issues	Generic framework on good practice
Freedom of information	Human resource development
Growth in local enterprises (SME), and services	ICT for sectoral sustainable human development
Increase employment	Increase employment
Increase IT awareness	Information infrastructure
Increase tele-centres and access to rural areas	Liberalisation of telecom, promote open markets
Liberalise telecom market and encourage	Policies and legislation
competition	Policy, legal and regulatory provisions
Link scattered outer-islands	Public awareness
Literacy campaign	Regional co-operation
Promote e-business	Regulation
Regulation	Sharing developments
Review on tariff and customer services	Technology and knowledge transfer
Training and skills	Training and skills

**Source:** Adapted from Commonwealth Telecommunication Organisation (2001b)

that need to be addressed if efforts to implement ICT-related action plans are to provide a foundation for reaping the benefits of investment in ICTs.

### Visions for knowledge-driven development

A vision of a "global knowledge" or a "global information" society is being discussed in many forums around the world. This vision often refers to a society in which ICTs play a major role in enabling people to improve their social and economic circumstances. To mobilise efforts to build more inclusive knowledge societies, the goals and values of sustainable development and improved governance need to be at the core of any vision. However, it is also essential to recognise that people in different countries and regions of the world have multiple visions of their futures depending on their histories and present conditions. Visions of knowledge societies are needed that incorporate and respect the expectations of people in their communities. Plurality, as well as common goals, must be incorporated within the visions that guide ICT policy and related strategic actions. It is essential to recognise that, even in the most ICT-intensive environments, the use of new technologies will not substitute for all

conventional activities and practices. Everyone will not want to access information or to communicate using these technologies. Visions of the future must take account of the need for investment in opportunities for strengthening face-to-face social networks and the potential of the full range of older and newer ICTs.

Such visions should also be grounded in a realisation that learning how to design and use ICT applications proceeds very rapidly in some cases and very slowly in others. The speed of transformation depends on levels of awareness, how new applications are integrated with existing organisational and individual practices, and the emphasis that is given to education and training as well as to on-going support of all kinds. It should not simply be assumed that a given ICT application will provide a solution to particular development problems. Evaluations of the outcomes of ICT initiatives need to accommodate variations in the speed of the learning process and to acknowledge that considerable time is often necessary for beneficial outcomes to become apparent. Short-term thinking is a recipe for disappointment in constructing a stronger knowledge base.

### Frameworks for the development of ICTs

The resources of donor organisations and other public institutions are only a tiny



fraction of the investment needed to construct knowledge societies that rely intensively on ICTs. The private sector will need to invest heavily if the "digital divide" is to be narrowed. Since the private sector operates through markets that work effectively only if the appropriate legal and regulatory framework is in place, developing the legal and regulatory institutions is very important. To encourage e-commerce and e-government services to develop, there is also a need to stimulate some degree of competitive telecommunication supply and markets for the provision of Internet Service Provider (ISP) services as well as those for the supply of information technologies such as computers, servers and software (Commonwealth Secretariat, 2000).

Increasingly, the policy framework must address Internet-related issues. For instance, there are many issues surrounding the development of Internet Exchange Points (IXPs) that need to be addressed. IXPs are the physical installations created to facilitate interconnection between independent ISPs. IXPs are intended to provide a neutral ground for traffic exchange in contrast to private Internet peering that facilitates the owners' interconnection with second parties. Developments in this area affect the costs and routing of Internet traffic and create a need for policies that will benefit lower income countries.

### **Strategies for human resource development**

The urgency of capacity building for constructing a stronger knowledge base cannot be over-emphasised because the range of skills (general and ICT-related) that is needed to participate in more information-intensive societies as citizens or consumers, or as producers, is enormous. Skills issues include literacy (and computer literacy) and access to education at all levels by both men and women. The costs of developing ICT-based education and training programmes for distance or open learning should not be underestimated. Farrell *et al.* (1999) argue that "while it is clear that the application of ICTs to the practice of open and distance learning is growing rapidly, ... the concept of truly virtual education is still more rhetorical than real". The World Wide Web is often used simply as a publishing medium without addressing the interactive potential of the

technology and there is as yet little valid and reliable data on questions of cost. While distance learning using the Internet can bring new information to hospitals and schools, these organisations may be poorly connected to social networks. Education and training require more than information delivered at a distance. Effective learning also requires institutions, skills and good management.

### **Development of the technical infrastructure**

Policy to promote the development of the technical infrastructure has often been focused narrowly on universal access to telephone services. However, there is a strong case for promoting collective forms of public access to ICTs, especially where the cost of private Internet access is too high for the majority of users (Girardet, 2001a). Such initiatives, especially those for rural areas, depend on a telecommunication infrastructure of some kind being in place. It must be possible to pay the high costs of maintenance, solve problems of finding local technicians, overcome the low earning capacity of the rural population, and to provide services that are attractive to non-literate users who may have little formal education or familiarity with ICT. The purposes of infrastructure development vary enormously and initiatives must be guided by whether proposed ICT applications are responsive to problems, not by the practice of implementing technology simply because the technological potential exists to do so.

### **E-government and improved governance**

Trends such as globalisation and the diffusion of ICTs are affecting traditional governance structures and there are new areas of governance which embrace e-commerce, the governance of knowledge, and the Internet. Globalisation often means the transfer of power from the state to global markets and sub-national groups. The enabling conditions for improved governance must be put in place, such as freedom of association and laws and regulations that create possibilities for citizen participation. ICT applications can play roles in all these areas if they are developed appropriately. Strategic initiatives require a high level of commitment and leadership as well as innovative and effective policy (W'O Okot-Uma, 2001). Creating conditions for the empowerment of



communities and the members of civil society also requires an infrastructure for participation and measures to foster a sense of citizenship and cultural identity.

It is one step towards enabling measures to address the "digital opportunities" and the "digital divide" to set out the issues that should guide such initiatives. A further and much more difficult step is required to implement new initiatives. Measures are needed to strengthen co-ordination between the various parties with an interest in the initiatives and to enable co-operation between them.

### **Strengthening co-ordination and co-operation**

Co-ordination and co-operation within and across the areas outlined above are essential to ensure that available resources are maximised and deployed in an effective way. Measures to take advantage of "digital opportunities" and to reduce the "digital divide" require action at many levels of government and within the private sector as well as by members of civil society organisations and citizens.

As indicated, one major role for government is to create a positive ICT environment through telecommunication reform and other ICT policies and by creating frameworks to protect investment. But governments can also provide incentives for e-service suppliers and users; promote education policies that increase literacy and general management and specialist ICT skills; and encourage effective institutions for developing, implementing and co-ordinating policies and strategies. Governments can play a role in expanding facilities for providing seed money (including micro-lending) for local research and development on low cost technologies and applications. They can encourage the establishment of business incubators and entrepreneurial networks. Co-operative inter-governmental partnerships can assist governments to create enabling national environments by sharing information, technical knowledge and expertise, by supporting ICT assistance programmes, and by encouraging cross-national ICT business networks and inward investment. Governments can also play a role in formulating national objectives and strategies for ICT within the wider

development context. Governments can champion ICT use by promoting e-government services and facilitating links between government and businesses, and between government and consumers and citizens. By establishing an enabling economic environment, governments can promote private enterprise, help to attract foreign direct investment and encourage domestic investment in the ICT industry.

Constructing a stronger knowledge base also means a growing role for entrepreneurial investors. It is difficult to estimate demand for ICTs (whether telecommunication or other e-services and applications) when the users have little or no experience of the potential benefits. This creates risks for investors who may apply models to calculate their returns on investment using assumptions that have been employed in the wealthier countries. Nevertheless, there is demand for telecommunication and other ICT services among people with very low incomes. An important source of change is entrepreneurial activity and investment. Entrepreneurs have initiative, ideas and expertise and they are introducing and developing ICT systems and applications in many lower income countries. They play an important role in e-commerce start-up firms and in providing education and technical training through local organisations and through their access to global co-operative networks. Entrepreneurs cannot succeed alone, however, because they often find it difficult to scale up their activities without other kinds of support. They need to be able to access a local research and development base and external networks of scientific and technical expertise. They also must be able manage contractual obligations and the ongoing costs of their services. Financing, and often micro-financing, is critical to their success as is the feasibility of payment by their customers. There is a role as well for large businesses in partnership with other agencies to develop relevant ICTs for development.

The members of civil society are increasingly supported in their development activities by non-governmental organisations (NGOs) that seek to link micro-level experience with macro-level policy. In this area, institutional linkages need to be strengthened and there is a need for better information flows. NGOs are making use of information systems in order to improve the

flow of ideas, experiences and information across national frontiers between all actors from the grass roots level outwards. Many NGOs have information officers who collect, analyse and disseminate information. In some cases, NGOs can provide a way for policy makers to access the views of members of civil society. In addition, they can help to ensure that vulnerable people, including those on low incomes, lone parents, the elderly, people without qualifications or with low levels of literacy, the unemployed or underemployed, people in areas which lack infrastructure, women and girls, and people with disabilities, can make inputs into policy-making and the development of ICT applications.

Achieving synergies between the activities of governments, the private sector including entrepreneurs, civil society organisations and citizens is likely to augment efforts to construct an enhanced foundation for knowledge-driven development. The following section highlights some of the activities of the Commonwealth group of agencies to indicate how already existing efforts to develop ICTs for development can be clustered in order to achieve an even greater effect.

### The Commonwealth agencies' role

In the light of the numerous global initiatives that are underway to address the "digital divide", the Commonwealth agencies have sought to add value in areas that build on their existing strengths. The Commonwealth is an association of 54 countries covering 1.7 billion people. More than half of the Commonwealth countries are small, often island, states and several are among the least developed countries. These countries face difficult constraints in developing their ICT capacities. The Commonwealth is playing a major role in disseminating information about ICT initiatives that have proven to be successful and in helping to tailor those experiences to local conditions. The Commonwealth has an existing institutional infrastructure that can be deployed to facilitate the use of ICTs in developing countries.

Commonwealth governments with expertise and human and financial resources in the ICT area are working with those with limited ICT capacity to construct a stronger

knowledge base. Many of the Commonwealth's own agencies have programmes to develop partnerships to create an enabling environment for ICT applications. The similarity of the Commonwealth institutions and legal frameworks provides considerable scope for advancing ICT initiatives through assistance programmes. Among the Commonwealth initiatives that are using ICTs to support social and economic development initiatives are those shown in Table III.

Among these Commonwealth initiatives, there is scope to further support the construction of an enhanced knowledge base. Several ways of promoting an extension of existing effort include the development of:

- *Knowledge "shops"*. Commonwealth agencies are involved in the development of innovative models and strategies for establishing tele-centres in partnership with other agencies, providing public points for accessing information and for mobilising support for ICT use. The Commonwealth of Learning (COL) and the Commonwealth Youth programme (CYP) tele-centres, for instance, are seeking to empower individuals through their ability to access information and through support for educational and literacy programmes.
- *Policy resource centres*. Commonwealth agencies have considerable experience in developing replicable sectoral policies and strategies. The Commonwealth Telecommunication Organisation (CTO), Commonwealth Network for Information Technology for Development (COMNET-IT) and the Commonwealth Business Council (CBC), for instance, have programmes targeted at audiences including government officials, industry and e-commerce institutions and entrepreneurs. These agencies provide technical support in developing ICT policies and application strategies and they have various means of facilitating their exchange and adapted replication.
- *Skills for ICT development and use*. The Commonwealth Telecommunication Organisation (CTO) has a major training programme to build a skills base that can support sustainable ICT development and applications which is delivered through workshops and seminars for

**Table III** Commonwealth capabilities for ICT

Agency	Areas of activity
<b>Commonwealth Telecommunication Organisation</b>	ICT policy and resource centres Skills for ICT development and use Tele-centres as knowledge shops E-Government
<b>Commonwealth of Learning</b>	Skills for ICT development and use Tele-centres as knowledge shops Knowledge networking
<b>COMNET-IT</b>	Skills for ICT development and use E-government
<b>Commonwealth Secretariat</b>	ICT policy and resource centres Skills for ICT development and use E-government Knowledge networking Tele-centres as knowledge shops
<b>Commonwealth Business Council</b>	All areas
<b>Commonwealth Association of Public Administration and Management</b>	Skills for ICT development and use  Knowledge networking
<b>Commonwealth Centre for Electronic Governance</b>	E-government

Source: Commonwealth Secretariat (2001)

policy makers and service providers. COMNET-IT provides a training programme for policy makers. The Commonwealth Association of Public Administration and Management (CAPAM) and the Commonwealth Secretariat deliver an informatics programme through which public service workers are trained to use ICT as an information, management and administrative tool.

- *e-government*. The Commonwealth Centre for Electronic Governance (CCEG) assists governments to develop knowledge management systems for the public service to enhance public administration and service delivery. It also focuses on ICT applications for data protection and privacy and record management practices. COMNET-IT provides skills training to government officials for setting up and managing e-government services, and it develops products for sharing good practices in this field. The Commonwealth Telecommunication Organisation (CTO) is providing skills training for e-governance to government officials as part of its services. The Commonwealth Secretariat has a comprehensive training programme for officials in the area of e-governance.

- *Information, innovation and professional development*. The Commonwealth Science Council (CSC) is supporting a Commonwealth Knowledge Network (CKN) in the area of science and technology and it is contributing to the national development of databanks. It is encouraging innovative solutions to development problems through access to information. It is using ICTs to enhance innovative capacity, facilitate technology brokering, and establish the ownership of traditional knowledge so that disputes on intellectual property rights can be resolved.

## Conclusion

The "digital divide" is multi-faceted. It is a phenomenon that exists at many levels – between socio-economic groups within countries, between companies with different capacities and resources, between geographical areas, and between countries with different resources and cultures. An enabling environment and the championing of ICT development and usage are essential to reduce the "digital divide" and to take advantage of ICT opportunities. But, without action to scale up existing initiatives it is unlikely that the visions of the benefits of

ICTs as effective tools for development will be fulfilled, at least not for the majority of those who are already marginalized by the effects of poverty.

The networks that can be supported by the use of ICTs hold much potential for strengthening democratic values and institutions and for promoting sustainable development. But the continuing uneven levels of access to technology, applications and skills is limiting the realisation of the potential benefits. The Commonwealth agencies' efforts to scale up their interventions are examples of the kinds of actions that are likely to mobilise investment. In these initiatives, as in the case of others that are underway, a very high priority must be given to ensuring that projects are responsive to local needs in the countries where they are implemented.

Strategic action on the part of agencies within their own organisations and in co-operation with other organisations is likely to help to facilitate the overall process of constructing a stronger knowledge base for knowledge-driven development, but there is no room for complacency. Initiatives designed to achieve more effective networking of knowledge often fail to become sustainable even when they are welcomed by those involved in their use. This may be the result of a failure to create imaginative solutions to resolve resource constraints and to a lack of co-ordination and co-operation. It may also signify the politics and struggles between those who find themselves promoting the particular interests of their own organisations rather than the interests of those citizens who may benefit from enhanced knowledge management using the new technologies. In all three of these instances, considerable effort is needed to focus on the purposes and goals of knowledge-driven development, rather than on the short-term interests of individual stakeholder organisations.

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