

Information and Communication Technologies for Development

Present Situation, Perspectives and Potential Areas for German Technical
Cooperation in Peru, Lao P.D.R., Vietnam, Tanzania and Uganda



Deutsche Gesellschaft für
Technische Zusammenarbeit (GTZ) GmbH

Division 43

Health, Education, Nutrition, Emergency Aid

IK-Technologien in der Entwicklungszusammenarbeit

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for Development Research, University of Bonn



ZEF Bonn

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This study was carried out against the background of the G8 countries' commitment to further and promote the use of Information and Telecommunications Technologies (ICTs) in developing countries, not only to prevent the "digital divide" from widening, but also as a potentially powerful means to alleviate pressing problems such as poverty, lack of education and inappropriate health services.

The meetings of the DOT Force Committee accordingly provided valuable input for the studies presented in this report, as did the Genoa Plan of Action, which outlines the direction for future involvement of the G8 countries in supporting developing countries in the field of ICTs.

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Bonn, January 2002

Romeo Bertolini, Dietrich Müller-Falcke, Gi Soon-Song and Maximo Torero

Disclaimer

Please note that the information collected during this study is subject to continuous and rapid change. This applies to legal, infrastructural and all kinds of project related developments but also to the Internet references mentioned in this report. The reader should therefore consider this study as a snapshot taken in October 2001.

The research team also would like to point out that - in light of the number of ICT-related activities going on in the pilot countries, the limited time spent in these countries and the short time available to conduct the study - the listed projects and efforts cannot be considered to be comprehensive.

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1 Introduction and Objectives

1.1 General Background

For some time now, information and knowledge have been considered important issues for developing countries. Information systems in developing countries often function in a way that makes the acquisition and distribution of information difficult and costly. This leads to inefficiencies and distortions in these economic systems, which often affect the poor and disadvantaged most severely.

The information problem of developing countries gained prominence through the 1984 International Telecommunication Union's (ITU) special report "The Missing Link", the so-called Maitland Report. The main issue it addressed was the deficiency of developing countries' telecommunication infrastructure, which was assumed to seriously constrain development prospects. The following focus on regulatory issues and changes in technologies, i.e. the rise of mobile communications and the Internet, along with a dramatic decline of prices for transmitting information, led to a widened agenda. In the second half of the 1990s, the importance of knowledge and the establishment of effective knowledge systems in developing countries became the prime topics. These days, attention has shifted to the major task of enabling developing countries to participate in and reap some of the supposed benefits of the "Global Information Society".

The major tools to acquire, store, process and disseminate information and to generate knowledge from information are modern information and communication technologies (ICT). In the discussion outlined above, almost every multinational organisation stresses the importance of ICT for sustainable economic development. The World Bank, for example, states in its World Development Report 1998/99 (World Bank 1998):

"This new technology greatly facilitates the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formation and execution, and widen the range of opportunities for business and the poor."

The United Nations Development Programme (UNDP) in its 2001 Human Development Report "Making New Technologies Work for Human Development" stresses the huge potential of ICT for sustainable economic and social development.

Seizing "digital opportunities for all" is the claim of a unique international co-operation in this area. Initiated by the 2000 G8 Summit in Okinawa in the "Okinawa Charter on Global Information Society", the "G8 Digital Opportunity Taskforce" (DOT Force) came into life. Within a couple of months this task force – a team composed of government representatives, the private sector, non-profit organisations and international organisations representing both developed and developing countries – developed a comprehensive framework of how to meet the challenge to let all people participate in the opportunities provided by the

information revolution. The task force's report, known as the "Genoa Plan of Action", calls for activities in a variety of areas while stressing the need for a co-operation between different actors, may they belong to governmental, private sector or non-profit organisations.

The activities of prime importance identified in the report are:

1. Help establish and support developing country and emerging economy national e-strategies.
2. Improve connectivity, increase access, lower costs.
3. Enhance human capacity development, knowledge creation and sharing.
4. Foster enterprise and entrepreneurship for sustainable economic development.
5. Establish and support universal participation in addressing new international policy and technical issues raised by the Internet and ICT.
6. Establish and support dedicated initiatives for the ICT inclusion of least developed countries.
7. Promote ICT for health care and in support against HIV/AIDS and other infectious and communicable diseases.
8. Support local content and applications creation by national and international effort.
9. Prioritise ICT in G8 and other development assistance policies and programmes and enhance coordination of multilateral ICT initiatives.

In the summer of 2001, the German members of the G8 DOT Force (Federal Ministry of Economics and Technology, Siemens Business Services GmbH, ZEF Bonn) together with the Federal Ministry of Economic Development and Co-operation (BMZ) and other German development organisations held discussions on their potential contribution to the DOT Force's issues. It was decided to first of all embark on a bilateral approach to promote the use, application and development of ICT in some pilot countries. After a discussion with the stakeholders mentioned above, Vietnam, Laos, Tanzania, Uganda and Peru were chosen to become the countries in which future German activities in relation to ICT might be carried out.

As a first step towards a German contribution, BMZ commissioned country studies on the five selected countries to the German Corporation for Technical Co-operation (GTZ), which assigned these studies to the Center for Development Research (ZEF Bonn).

1.2 Objectives

For each of the five pilot countries ZEF conducted a country study, as they are presented in this report. The country studies first attempt to give an insight into the ICT sectors, ICT-related activities and involved stakeholders. This information is assessed and, in a second step, the potentials of the ICT sectors, ICT-related activities and capacities of involved stakeholders are

evaluated. From this evaluation, potential starting points for future German involvement and co-operation are identified and, whenever possible, specific projects are proposed.

Survey of the Countries' ICT Sector, Activities and Stakeholders

For each country the report gives a comprehensive overview of the ICT sector, ICT-related activities and the stakeholders involved. It is structured according to the Genoa Plan of Action as described in the previous section, making it compatible to other ongoing initiatives by other DOT Force members. Nevertheless, a special emphasis is given, whenever possible, to national ICT policies and strategies, the state of privatisation and regulation of telecommunication markets, the ICT infrastructure (telecommunication networks, Internet, training and education), human resources in the ICT sector, corporate culture and performance of ICT-related enterprises, the role and activities of civil society actors, and the existence, scope and quality of local content and applications.

Evaluation of ICT Sector's Potential

Relying on the surveys on the ICT sectors and following the structure of the Genoa Plan of Action, the potentials of the pilot countries' ICT sectors and ICT-related activities are evaluated. Strengths and weaknesses are furthermore identified and discussed.

Identification of Starting Points for German Co-operation

Based on the strengths and weaknesses analysis mentioned above, potential starting points for a future German involvement and co-operation are identified and, whenever possible, specific projects are proposed. This process was, however, conducted under consideration of

- the proposed emphasis of German ICT activities in the continuing DOT Force context (e-strategy development, infrastructure development and human resource development),
- the focal topics of bilateral co-operation between German development co-operation,
- current and planned German activities,
- the pilot countries' and other donors' activities.

1.3 Organisation of the Report

The report first provides a brief introduction to the methodology applied in order to set up the study. This will be followed by a country-by-country overview about the major developments in the countries' ICT area focusing on the legal and infrastructural framework as well as the access of rural areas to telecommunication services. Furthermore, Internet-related developments and particularly their limitations will be outlined. The presentation of each country's strengths and weaknesses when it comes to ICT developments will then be followed by recommendations for potential German involvement. Cross-sectional thoughts concerning lessons learnt and implications for future strategies as well as a short summary of the consultation of German experts and actors will conclude this study.

Two tabular overviews are provided in the Annex for each country: the first summarises ongoing support of ICT activities by bi- and multilateral development assistance. It also sums-up the activities and foci that could be contributed by German actors, i.e. the organisation of financial and technical co-operation. The second table summarises the identified strengths and weaknesses in a synoptic manner¹.

¹ The five in-depth country reports on which the findings in those tables and this report base are available from the editors and authors.
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2 Country Studies

2.1 Methodology

The studies were conducted in a two-stage information gathering process, starting with a desk study and then verifying and adding information on the basis of an in-country assessment.

Desk Study

This first step served to gain a knowledge base and an overview about the general ICT situation and its absolute and relative development in the target countries. It also helped to identify actors involved in ICT from the public, the non-profit and the private sector. Furthermore, the review provided the basis to build up appropriate knowledge for the first-hand information gathering and for the discussions with actors in the pilot countries. Major indicators and issues that were assessed in this first step contain:

- the infrastructural situation such as access to basic telecommunication services as well as to ICT applications in both urban and rural areas;
- the regulatory framework of both the telecommunication and the value added markets;
- the degree to which ICT application within the public sector, especially schools and post-secondary education, are already existent;
- existing projects in the field of ICT for development including donors and major actors of these projects as well as performance indicators of the projects.

First-hand Information Gathering

With the information gathered in the countries themselves, the output generated through the desk studies was verified and extended; beyond that, further key players that could not be identified through the desk study were identified. Country interviews involving actors from the public, the non-profit and the private sector created knowledge about the general ICT situation and most recent developments.

In order to obtain consistency between the various pilot countries, the interviews were carried out using a qualitative expert interview guideline. Due to the diversity of the interviewees' background and expertise, this guideline was rather open in its design and allowed, beyond the discussion of the focal areas set by the Genoa Plan of Action, the assessment of anecdotes, personal views and concrete proposals for action. Expert interviews were usually carried out with one individual; in some cases, however, a discussion with a group of people was made possible.

Beyond that, handouts regarding specific projects and institutions were collected from the interviewees and used for analyses. Moreover, participation in conferences and meetings in the countries which happened to be set up during the stay of ZEF researchers were attended and used as information sources.

As far as activities of the German bi-lateral co-operation are concerned, actors at the regional units at GTZ's headquarter as well as GTZ officials in the target countries were consulted. Where relevant for the ICT-for-development issue, interviewees from other German organisations were contacted.

Consultation of German Actors

In order to collect, organise and systemise and bundle inputs provided by the German institutions involved in bi- and multilateral development co-operation, email-based information distribution was set up, which kept the relevant organisations of the private, the public and the non-profit sector updated. The selection of these organisations was guided by their involvement in the DotForce process and by the interest they expressed. In the case of non-profit organisations, those signalling an interest in the topic through the attendance of a ZEF-organised workshop on issues of the digital divide in early 2001 were contacted.

A meeting of Germany's major actors of development co-operation was also held in order to discuss the first results of the study and to satisfy the demand for information raised by ongoing German involvement in international bodies that discuss issues of the digital divide.

Analysis and Recommendations

To comply with the third objective of this study, results and analyses are presented in a rather pragmatic and action-oriented manner. The overviews of activities in the ICT field are furthermore twofold: on the one hand sector developments, problems and trends are described, but on the other hand the albeit limited attempt is made to look beyond the ICT sector and highlight how some of its activities seem to create opportunities for socio-economic growth outside the ICT-sector.

Based on the research team's experiences and the continuous discussion amongst its members as well as with experts from outside ZEF, the analyses are characterised by an iterative process which did not target at a comparison of the various countries, but was guided by the aim of streamlining the findings according to the joint issues raised in the Genoa Plan of Action.

Both primary and secondary data were collected during September and October 2001 with the in-country assessments taking place during the last 3 weeks in October. Both the data processing and analyses as well as the communication with German actors went beyond this timeframe until the end of 2001.

2.2 Country Overviews

2.2.1 Peru Country Overview

Peru is an economy dominated by the service and the manufacturing sector, whereas agriculture is of less significance in the economic structure of the country. At the end of the nineties it was estimated that services constituted 45% of economic activity and the manufacturing sector 42%, while agriculture accounted for only 13%. Peru has a per capita income of around US\$ 2,500 per year and is classified as a country of lower-middle income. The distribution of income, though, is characterized by strong inequality, in which the top 10% of the households concentrate close to 35% of the national income, while the lower 10% of households have a share of only 2%. More than 54% of the population live under conditions of poverty and around 13% under extreme poverty². Although official statistics show an unemployment rate of less than 8% by the end of the nineties, there is a significant degree of under-employed with high job instability and very low wages, composing what is known as “informal economy”. The balance of trade shows a deficit of around US\$ 2.5 billion and external debt amounts to more than US\$ 30 billion.

Table 1: Country Overview

Capital	Lima
Population	27,483,864
% of rural population	20.8
Population density	20.0 persons / km ²
Currency (US\$ exchange rate)	1 Sol = 0.28 US \$
Major language	Spanish
GDP per capita (PPP)	4,864.0
Population below the poverty line	54%
Gini coefficient	0.46
Administrative structure	24 departments, 1 constitutional province
Literacy rate	89.6%
Infant mortality rate	42

Source: HDR, WDR

During the last decade the government has implemented a harsh macroeconomic stabilisation programme starting in August 1991 and the months following with the launch of a comprehensive set of structural reforms. Peru experienced one of the fastest trade liberalization processes and one of the deepest labour market reforms in Latin America. These reforms were accompanied by a downsizing of the public sector, the start of a privatisation process, the abolition of all state-owned monopolies and a tax reform. In addition, restrictions to capital account transactions were eliminated while the financial sector was deregulated.

² Poverty in Peru has changed dramatically over the last three decades, experiencing not only an important reduction but also compositional changes. While in the early 1970s poverty was largely rural – two thirds of the poor were rural dwellers employed in agriculture - the picture reversed in the mid-1990s, at which point two thirds of the poor were reported to be urban dwellers. Hence, while urban poverty rates have risen by ten points over the last 28 years, in the rural sector poverty has fallen by 18 points.

2.2.1.1 Major Developments in the ICT Sector

In the telecom sector, the Peruvian government sold both Compañía Peruana de Teléfonos (CPT) and Empresa Nacional de Telecomunicaciones (ENTEL). CPT was the company that provided basic telecom services in the Lima area while ENTEL was the national and long distance carrier as well as the provider of local telecom service in the rest of Peru. Briefly after having bought both companies, Telefónica de España S.A.³ merged them and created Telefónica del Perú S.A. (TdP). TdP was granted, initially for a five year period, the national monopoly for the provision of lines, local calls, national long distance (NLD) and international long distance (ILD) through all the country. Simultaneously, the government created the Supervisory Agency for Private Investment in Telecommunications (OSIPTEL, by its Spanish acronym). Table 3 shows the main results of the privatisation.

Table 2: ICT Sector Overview

Market structure	Fixed lines: actual monopoly
Fixed phone operators	6 licensed but only 1 operational
Mobile phone operators	3 operational
Internet service providers	54
Digitisation of the network (%)	96
Number of fixed lines in use (per 100 habitants)	2,022,265 (6.6)
Number of mobile phones (per 100 habitants)	1,400,000 (5.1)
Number of public phones (per 1000 habitants)	80,051 (2.1)
Number of Internet/email subscribers (%)	800,000 (2.9)
Number of PCs per 1000 habitants	35.7
Number of public access point to the Internet ⁴	900
Local call charge per minute: fixed phone	US\$ 0.027
Local call charge per minute: mobile phone	US\$ 0.18
Average dial-up cost for a month using 30 hours ⁵	US\$ 52
Radios (penetration rate, % of household)	97.75
TV receivers (penetration rate, % of households)	96.32

Source: ITU, WDR

Table 3: Performance of the Telecommunications Sector

	1993	08-1998	03-2001
Installed fixed lines	670 400	1 959 000	2 022 265
Waiting time to install a fixed line	118 months	45 days	45 days
Installation charge	US\$ 1,500	US\$ 170	US\$ 160
Fixed lines per 100 habitants	2,7	6,2	6,6
Localities with telephones	1 450	3 000	3 240
Public telephones	8 000	47.040	80.051
Digitisation of the network	33%	89%	96%
Optic fibre (km)	200	3 000	8 173
Employment in the sector	13 000	n.a.	34 000 (6/2000)

Source: OSIPTEL

3 Telefónica paid \$ 2,004 million, an amount larger by far than the second highest bid (\$ 800 million), which was actually close to the base price set by the government.

4 Estimated number of facilities where people have access to the Internet and email services.

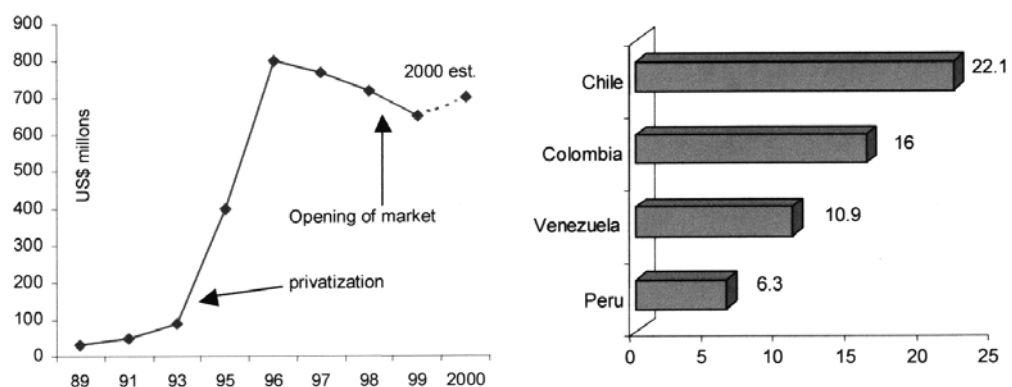
5 Including initial subscription fee, monthly fee and call charges.

Box 1: Privatisation Results.

The major objective of Telefónica was to increase the penetration rate. Graph 1 shows the development of the network expansion during 1993-2000 and the overall increase of approximately 167% in the number of lines installed. Graph 1 also shows a small decline in the number of lines in service after 1997 as a consequence of the high fixed charges and the increase in the penetration of cellular phones. A further decline is verified after 1998, which could be an indication of excess coverage in the sector. In terms of coverage, Telefónica del Perú was able to comply with the concession goals, and by 1998 it had already covered the entire market for basic telephony. This may be the reason why Telefónica decided to advance the date for terminating the period of limited competition granted until 1999. The quality of services provided by the state-owned enterprises CPT and ENTEL was below international standards. In 1992, only 35-40% of all phone calls were completed. This was partly due to the small size and obsolete technology of the network, which made it prone to congestion. In 1993, only 33% of the network were digitised. After privatisation 90-98% of all phones calls were completed with the exception of national long distance, of which it were only around 50%. As shown in Table 3, all the performance indicators after privatisation show significant improvement. In addition, Table 4 shows the results in cellular phones and other non-regulated sectors, all of which increased their penetration significantly establishing the necessary infrastructure for a potential development of ICT within the country.

Graph 1: Developments of Telecommunications in Peru

Evolution of investment in the telecommunications sector in Peru 1989-2000, and number of lines per 100 habitants in comparison to other Latin-American countries for 2000.



Source: OSIPTEL and ITU

After the termination of the limited competition phase, the government opened the market to new operators for the provision of local, national and international long distance telephony services. New entrants could also use Telefónica's infrastructure by paying an interconnection fee.⁶ This proved to be a controversial issue and required Osipitel's⁷ intervention because of lack of agreement among private companies.

Based on the opening of the market, the government's main objectives in the sector until 2003 are in summary: to increase teledensity to 20 lines per 100 habitants, to give access to 5000 new cities (small towns) under the development of rural telephony, to continue to improve the quality of the service, and to implement the digital network of integrated services.

⁶ The maximum fee for daytime interconnection was first set at US\$ 0.029 per minute; this fee was much higher than fees charged in Chile (US\$ 0.017) or Mexico (US\$ 0.022).

⁷ OSIPTEL is the regulatory agency of the telecommunications sector.

Table 4: Evolution of Non-Regulated Sectors

	1993	08-1998	03-2001
Cellular telephones subscribers	36 000	750 000	1 400 000
Cities with access to cellular phones	7	117	120
Subscribers to cable television	725	350 000	430 000
Number of Cable firms	6	52	109
Internet Users	n.a.	> 100 000	> 800 000

Source: OSIPTEL

2.2.1.2 Rural Connectivity

Given the adverse socio-geographic conditions of rural Peru, the Fund for Investments in Telecommunications (FITEL) was created under OSIPTEL to promote private investment of telecommunication companies in these poor areas by subsidising their activities with the objective of providing universal access to telephone services in most of rural Peru. The main objective of FITEL, however, is not only to promote access to telephones but also to promote social and economic development by including these poor regions in the information society through an appropriate access to the Internet and the development of local networks. Up to now FITEL has assigned six projects of rural telephony, which will benefit 4,440 rural cities covering approximately 3.9 million rural inhabitants and translates into 8,653 rural telephones installed. The objective for 2003 is to reach 5000 rural cities⁸.

2.2.1.3 The Internet in Peru

The estimated number of Internet users in mid-1996 (dial-up and dedicated) was put at around 30,000, while by the end of 1999, this figure was around 500,000 – close to a 15 fold increase in less than three-and-a-half years. Internet user penetration grew from 0.1 per cent to 1.9 per cent during the same period (Graph 2).⁹

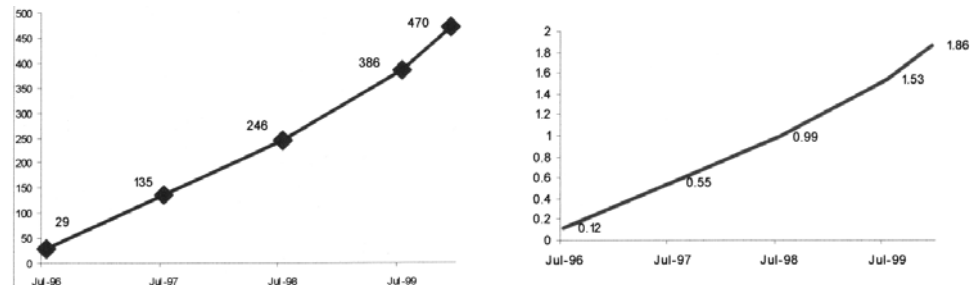
As regards the number of companies in the Internet market, it is interesting to observe that owing to favourable market conditions the situation has changed from a duopoly, existing until July 1996, to as many as 54 ISPs two years later. The services provided by these ISPs have generated a rapid expansion in Internet traffic, which grew by nearly 80% during 1998/00. This means that the share of Internet traffic in all locally switched traffic rose from 5% in 1998 to 10% in 2000. Since July 1998, the number of ISPs has been falling owing to a consolidation of the industry in the hands of TdP via the bigger Centro Proveedor de Información (CPI, by its Spanish acronym) affiliated to it. Nevertheless, in the last year growth continued in the number of companies authorized to provide this service.

8 There are currently five main projects in the process of implementation. Gilat to Home is in charge of the North Project (Amazonas, Cajamarca and Piura) and the Central West Project (Huanuco, Junin, Urna, Pasco and Ucayali). Cand G-Avantec has the concession for the Central North (Ancash, La Libertad and Lambayeque) and Telerep received the concessions for the South (Arequipa, Moquegua, Puno and Tacna), Central South (Apurimac, Ayacucho, Cusco, Huancavelica, Ica and Madre de Dios) and the Northern Jungle (Loreto and San Martin) projects. In the last months, however, Gilat to Home has taken over the projects from Telerep according to information provided by FITEL.

9 The figures for dial-up users correspond to information supplied by the leading firms involved in the business. In the case of dedicated users, the number of users corresponds to estimates supplied by the same firms. It should be emphasized that it is very difficult to estimate the number of users who have access to public Internet centres since there is no need to be registered to use the latter. No official estimates of Internet market share are available.

Graph 2: The growth explosion

Evolution in the estimated number of users and proportion of Internet users relative to the total population July 1996-December 2000



Source: Telefónica del Perú, OSIPTEL

Box 2: Limitations to the Internet

The traditional form of Internet access requires a computer, a telephone line and software. In Peru, however, the number of people having the first two items is very low. At the end of 1998, the penetration of the basic fixed telephone service was less than seven lines per 100 inhabitants. And in 1997, only 20.1 per cent of urban households had a computer. Consequently, the potential number of dial-up Internet users is very low.

On the other hand, the total cost for the various items required for Internet access is far above the average income of the vast majority of the population¹⁰. With the aim of removing some of these limitations of infrastructure and cost, there have been several efforts like that of Red Científica Peruana (RCP) which developed the public Internet centre project, through which users are provided with computers and relatively cheap Internet access; furthermore there have been efforts by several NGO's (CEDEP, ITDG, etc) to diffuse the idea of telecentres in poor areas. The problem is that most of these initiatives up to today remain mostly pilot studies or proposals and have not yet been implemented in a more universal manner. On the other hand, in its 1998 guidelines for opening up the market the Government laid down a substantial increase in Internet access as an objective for 2003. By means of the projects of the telecommunication investment fund (FITEL), it is hoped to issue a call for tenders in 2001 so that the private sector can take responsibility for providing Internet service in over 2000 rural localities.

Partially Isolated

Percentage of households with various communication services: Peru 1997, 2000.

Service	Percentage of households	
	1997	2000
Telephone	23.45%	26.02%
PC	2.99%	4.51%
Fax	-	-
Cable TV	-	2.64%
Cellular telephone	1.84%	4.93%
Internet	0.33%	1.10%

Source : LSMS (Living Standard Measurement Survey) 1997, 2000.
Number of observations: 3843 (1997) and 3997 (2000)

Percentage of households in metropolitan Lima with various communication services: 1997, 2000.

Service	Percentage of households	
	1997	2000
Television	95.71%	96.32%
Radio	100.00%	97.75%
Telephone	44.90%	46.78%
Cable TV	-	4.09%
PC	8.37%	9.93%
Internet	1.12%	2.35%
Cellular telephone	5.51%	11.36%

Source : LSMS (Living Standard Measurement Survey) 1997, 2000.
Number of observations: 980 (1997) and 997 (2000)

10 (1) Computer (US\$ 1000-2000: single payment); (2) Telephone line (US\$ 150: single payment); (3) Internet provider (US\$ 5 per month); (4) Monthly telephone rental (irrespective of use) (US\$ 16 per month) and (5) Telephone calls (US\$ 0.027 per minute).

2.2.1.4 Discussing Strengths and Weaknesses¹¹

When implementing IT in a country, there are some pre-requisites which will be of crucial relevance especially when the technologies are used in conjunction with new market opportunities and the provision of goods and services. These pre-requisites are basically:

- The presence of a proactive government not only in terms of promoting ICTs through appropriate legislation and projects, but also in terms of giving access to government information. For instance, the government could give all citizens equal access to information and consider adopting electronic tools for government portals providing education and health services information or streamlining public procurement;
- A dynamic and proactive private sector. This will be essential and will increase private investment in ICTs as well as open more possibilities to potential public and private partnerships in low income areas with social priority.
- Appropriate and forward-looking IT and telecommunication public policies, legislation and an understanding of their overall impact on a country's welfare. This includes taking into account trends in globalisation, adequate tariffs to access internet, adequate regulations for e-commerce, and compliance with international practices.
- Adequate infrastructure. This is a very important pre-condition to be able to get the benefits of ICTs. With appropriate infrastructure simple applications can have big impacts at all levels. The country has to learn from other countries and adopt the most current approaches.

A proactive government on ICT characterized Peru during the last decade. The previous government had developed a national strategy of Internet massification which, despite its still existent need for substantial improvement, was an important starting point for the new government. Most of the government agencies already have their own web pages and there is a unique information portal on government activities, as well as an active participation of government officials in international initiatives on ICTs. Nevertheless, the current government has decided to concentrate its efforts – at least in the short run – on the development of a long distance education plan (Plan Huascarán) and has still not implemented or improved the existing national strategy, while the government portal is losing its continuity.

On the other hand, Peru is characterized by the presence of a very pro-active private sector. Since the privatisation of telecommunications in 1994, the private sector has started to actively participate in the economy and has effected a significant increase in the Peruvian infrastructure. In addition, there has been an important entrance of new firms in cellular and Internet services since the market for telecommunications opened in 1998. It is important, though, to mention that there are still some major problems in terms of the current market.

- The presence of strong barriers to market entry posed by the incumbent firm, basically because there is no clear regulatory policy with regards to the interconnection charge. New companies therefore cannot participate on equal conditions with the incumbent firm.

¹¹ A tabular overview about strengths and weaknesses is attached to this report.

- The need of more autonomy for the regulatory agency. For example, the Peruvian congress is currently questioning the regulatory agency (OSIPTEL) and is reviewing all their decisions of the last years.
- The need of more investment in infrastructure in rural areas. Despite the adequate strategy followed by FITEC during the last years, the rural areas still do not have an adequate infrastructure, and there is no clear consensus on the target of governmental investment (a clear example of this is the conflict between FITEC and the Ministry of Communications).
- The need to coordinate the isolated efforts in infrastructure investments and IT projects. For example, it is common to find cases in which computers are installed in schools in villages where electricity is supplied for only 1 or 2 hours a day.

As a result of the above, the prices of IT services are still high and access is still very limited in poor and rural areas. There are nevertheless several efforts by private firms and NGOs to develop IT projects worth mentioning. For example, there are currently some pilot projects as the Ashaninka project funded by IDRC, the Information Systems for Rural Development in Cajamarca by the Intermediate Technology Development Group (ITDG), projects developed by Red Científica Peruana (RCP), the project of Agrarian information in Chancay-Huaral by the Centro de Estudios Peruanos (CEPES) and many other pilot projects or ideas for development projects. But, as previously mentioned, despite this strong interest it is clear from the evaluation carried out that most of these projects are isolated efforts and not coordinated within a global strategy of rural development.

On the other hand, an additional major limitation is that in most cases the plans are too ambitious and not consistent with the reality of infrastructure in the country. It should be mentioned, though, that FITEC is currently trying to coordinate some of these projects and is evaluating them to identify those which could be replicated in other rural locations of the country.

One other major limitation in Peru is the still existing lack of adequate legislation to promote the use of ICT. There is still a lot to do in terms of property rights, patents and regulations for e-commerce. However, the Peruvian Institute of Electronic Commerce¹² is very active in this respect.

With respect to human capital creation for IT fields, there exists a significant infrastructure in terms of University programmes and institutes for IT training, which has been a boom sector in the last years. Still, it is important to mention that there is a strong variance concerning the quality and contents of the different programmes offered, and only a few of them produce well qualified IT specialists.

Finally, Peru is most of times perceived as a country that had a significant development in ICT, which despite being far from the truth also limits the presence of international assistance. This clearly affects projects of rural development in which international support is necessary because of the low penetration rates and the resulting low profitability of these projects.

¹² The Peruvian Institute of Electronic Commerce (IPCE) is a non-profit civil association whose main objective is to promote the development of electronic commerce through research, proposals, and the diffusion of new knowledge. The institute resulted from an initiative of the government, through the Commission for Promotion of Exports (Prompex in its Spanish acronym), to join the efforts of the public and private sector in all activities related to electronic commerce.

2.2.1.5 Potential Areas of German Contribution

As shown above, Peru is a country that has progressed a lot concerning access to information technologies in the last 8 years, although the digital divide is still strong, especially in the poorer areas where information technologies are still not present. These poor households therefore cannot obtain the benefits of the information available via IT.

To identify the areas of potential German contribution it is important to first define the possible scope of interventions. We believe that interventions could mainly occur at two levels: the local and the national. At the local level (the village, district or in some cases the urban level), IT provides citizens with information about, for instance, market prices and social services, such as health, general knowledge and education helping households to reduce middleman costs. At the national level, one finds more complex IT systems that carry information about jobs, long distance education, investment opportunities or goods and services.

In the next two subsections, we will identify the broad areas at each of the specific levels where we think the German contribution might generate major benefits.

Contribution at the National Level

If we employ a broader definition of poverty which sees poverty also as being deprived of the information needed to participate in the ‘wider’ society (be that at the local, national or global level), there are several ways through which the poor can benefit directly from IT. These include: the child who learns or receives lectures through the Internet; the citizen who accesses job opportunities through an information centre; a databank and interactive web page that enables NGO workers to give accurate answers to citizens in need of legal assistance; and a databank of tools that will help SMEs to comply with formality procedures as accounting, tax payments, etc.

Within this framework we believe the German contribution could help in the following areas at the national level:

Advice on the Global IT Strategy

As mentioned in the previous section, Peru has already developed a global IT strategy but it has not yet been officially formalized and implemented by the current government. We believe that German contribution could help in improving this national strategy and in its implementation by requesting the Peruvian government to have a global IT strategy implemented as a pre-condition for any international co-operation.

e-Government

Peru was characterized during the previous government by its intense use of IT technologies in several areas at the national level. The most important improvement took place at the government level, where the Peruvian government not only made efforts to increase their 9% of governmental bodies with institutional web, but also attempted to involve citizens in the activities of public institutions. The main online services include, in fact, forum discussions, requests and suggestions via e-mail and public administration information. By the middle of

2001, just when the transitional government ended, the government finally implemented an unique information portal to citizens. This was meant to allow citizens to get information about state activities and to use this information as a mechanism to control public administration. Citizens are stimulated to participate by suggesting changes in the programme or asking for other information to be included on the web page.

During the first six months of the current government, however, this portal has not been actualised and most of its information is out of date. In this regard we believe that one road for co-operation of the German Government could be to advise and financially support this information portal in order to maintain its continuity over time. According to the current legal framework, the institution which is supposed to centralize all this information is the National Institute of Statistics and Informatics.

Rural Connectivity

As mentioned previously, one of the major problems in terms of IT technologies is the limited penetration rate of rural areas in Peru. In this regard, we believe the work done by the Telecommunication Investment Fund (FITEL) to be on the right track, but it needs additional support. During the second stage of development, FITEL's main objective is to increase access to public phones in rural areas by connecting 1500 villages with 1000 to 5000 habitants. In addition – and here we believe the German contribution will be very useful – FITEL wants to develop telecentres in all the district capitals of the country emphasizing the setting up of portals with regional contents and information databases in topics relevant for each specific area. In this respect we believe that there is a direct link with the pilot projects mentioned under “Contributions at the Local Level”; in that context this can be regarded as the second stage of FITEL's development strategy and as a pre-condition for these pilot projects to be replicable.

One additional aspect we believe the German side should consider in their potential support to FITEL is the potentiality of developing private and public partnerships (PPPs) for establishing these telecentres. It is clear from our interviews and visits that the private sector (for example the companies which hold the concessions for rural telephony) will be extremely interested in making partnerships with FITEL. These PPPs will allow the firms, with an adequate support on the initially required investments, to develop telecentres and regional content portals that could also benefit their own activities in the regions and make the telecentres self-funded over time.

Long Distance Education

As mentioned in the section on strengths and weaknesses, the major project currently supported by the government is the long distance education programme called “Plan Huascarán”. This plan consists of three projects which started already under the previous government. After analysing each of these projects we believe that the German government should restrict its support on the long distance education project (EDIST) by the Ministry of Education. Facing the fact that the vast majority of secondary schools are to be found only in the main cities, the EDIST project concentrates on long distance education for secondary schools in rural areas. Therefore EDIST will reach the poorer villages of the country and as a consequence could be of significant impact in the process of poverty reduction.

Small, Medium and Micro-enterprise (SMEs) Box of Tools

In Peru, approximately 40% of the economically active population are concentrated in the SME sector (firms less than 10 workers), and approximately 90% of all establishments belong to this sector. Among the major characteristics of SMEs are low wages, informality and low productivity. We believe that ICT could be of great use to enable SMEs to improve their performance.

Currently there are two SME portals developed by the Ministry of Industry. They are called INFOSIEM and the Tool Box for SMEs. INFOSIEM provides information on suppliers, financial institutions, suppliers of technical assistance and other institutions that support SMEs. On the other hand, The Tool Box for SMEs (Caja de Herramientas de Gestion para la PYME) is a web site developed by the Ministry of Industry with the co-operation of GTZ in which several tools are put online to help SMEs to improve their performance. There is for example a section with information on how to pay taxes, and links that will help the SMEs to become formalized and to comply with legal regulations.

At present, neither of these portals is interactive, they basically consist of several links and documents with information. We believe that German contribution could help to improve this effort to the effect that the portals become interactive and also include direct links to the different institutions, which would considerably facilitate the gathering of information for SMEs. These types of projects have, in addition, a significant probability of being able to become self-funding in the long run, something which makes them a very interesting alternative for international co-operation.

Decentralization

Currently there is a initiative by FITEL and Pontifica Universidad Católica del Perú to develop a Public Portal for Local Governments on the national level. This is a project still in evaluation, but we believe it will be an important area to support as its main objective is to complement the decentralization process. This portal will also give access to information on local governments in order to enhance the accountability of their work to society. Furthermore, it is planned to become a window for local governments to promote their cities.

Poverty Management

Finally, we believe that a potential for the German contribution within the e-government strategy could also lie in the utilisation of IT in support of the existing poverty reduction programmes. Cross-cutting areas in poverty management can be greatly aided by introducing IT technologies. An example for this would be a database that organises and monitors the progress of a number of poverty alleviation projects which are implemented by development organisations, such as FONCODES (National Fund of Compensation and Social Development). This may include direct polling of information from the field, email, informative websites, monitoring, and evaluation data.

Contribution at the Local Level

Contributions on the local level should aim at a direct benefit for the poor. Furthermore there is the possibility for successful projects to be replicable at the national level through FITEL.

There are currently several isolated pilot projects in very initial stages of development which could greatly benefit from German contribution. We believe, however, that the German contribution should only go into those projects that clearly show potentials for replication, include not only IT technologies but also contents, and which could become self-funded (as private or as private and public partnerships) in the medium and long run.

2.2.2 Vietnam Country Overview

After the reunification of North and South Vietnam in 1976, the economic reconstruction of the country has proven difficult. It was hindered by the old Communist Party leaders and additionally hampered by the loss of support from the old Soviet Bloc by the end of the 80s. Real progress started to gain momentum from 1986 onwards when the country embarked on a perestroika-like reform course (Doi Moi, Renovation). Annual growth rates of around 9% were realised between 1993 and 1997.

With the Asian crisis, existing problems in the Vietnamese economy became apparent and reaffirmed the government's belief that a shift towards a market oriented economy would make things rather worse than better. Growth rates of the late 90s were pending at about 5%. Despite significant progress, more than 37% of the population still lived below the poverty line in 1998.

Table 1: Country Overview

Capital	Hanoi
Population	79,939,014
% of rural population	> 80
Population density	241.2 persons / km ²
Currency (US\$ exchange rate)	1000 Dong = US\$ 0.07
Major language	Vietnamese
GDP per capita (PPP)	2026.0
Population below the poverty line	37% (1998)
Gini coefficient	0,36
Administrative structure	58 provinces, 3 municipalities, > 9000 communes
Literacy rate	93,1
Infant mortality rate	31

Source: HDR, WDR

In terms of economic policy, the government of Vietnam – facing recent decreases in FDI – slowly and gradually applies structural reforms to revivify the economy and produce more competitive, export-driven industries and not least attract foreign enterprises and international agencies to support the Vietnamese economic development: in 2000, the trade balance brought about a deficit of around US\$ 0.9 billion and the country accumulated external debts of US\$ 13 billion while receiving US\$ 2.1 billion in credits and grants from the international donor community. Similar to China, the government is, however, following a hands-on approach. For instance, foreign ownership within the private sector is still exclusively viable through joint ventures and business co-operation agreements with Vietnamese counterparts

and requires a permission from administration. As obvious from the next section, this also holds true for the telecommunication and related value-added service sectors.

2.2.2.1 Major Developments in the ICT Sector

Until recently, the telecommunications market of Vietnam was characterised by strict state regulations, monopolistic market conditions and tight control of all kinds of telecommunication and Internet services offered. Since embarking on its Doi Moi reform course in 1986, the Vietnamese government has been committed to a policy of privatisation of state-owned enterprises (SOEs). The creation of a comprehensive, modern and stable telecommunication network is one part of these efforts and is beyond this regarded as a crucial prerequisite to meet the requirements of the 21st century and to foster the competitiveness of the country. In light of such commitments, ICT development gained momentum. Until 1993, the Department General of Posts and Telecommunication (DGPT), an affiliate of the government, was the sole telecommunications organisation in Vietnam. In that year, two separate organisations with particular tasks were created: DGPT was entrusted with the function of state regulatory body in charge of strategy planning and management of the national telecommunication network expansion and market development. The then newly found Vietnam Post and Telecommunications (VNPT), which has branches in all 61 provinces and major cities and was equipped with the state-granted monopoly for operating the national telecommunication network. In the same year, the first national information technology policy, in accordance with plans of transforming the economy towards a market economy, was provided by the milestone Resolution 49/CP on Development of Information Technology. Two years later, Vietnam joined the ASEAN and witnessed the normalization of trade relations with the US, which eventually led to a bilateral trade agreement (BTA) between the countries. As part of the Doi Moi policy, a new Law on Foreign Investment was issued, which immensely helped to accelerate the pace of ICT development and domestic demand for ICT equipment. 1996 saw the implementation of a national programme aimed at establishing a modern ICT infrastructure and boosting ICT application in all fields of social life. The first general regulations relevant to all aspects of ICT in Vietnam were contained in Decree No. 109 of Posts and Telecommunications a year later. Since 1996, the telecommunication sector has gradually been liberalised, and today there are two other fixed-line operators that at least partly compete on the highly lucrative HCMC and long distance markets. This has resulted in a significant decline of prices. However, competition amongst these players is only partly real because all price changes require approval from DGPT and the central government.

Box 1: Results from Sector Reform

With the sector reform, the number of telephone subscribers has significantly increased in Vietnam. Starting from app. 775,000 fixed lines plus 23,500 mobile phone subscribers by the end of 1995, a total of more than 5 mill. telephones were in operation by the end of 2001 (cf. Table 3; Graph 1). This is equivalent to a compound average growth rate of 30% during the mentioned time period lifting teledensity from 1.08 to app. 6.25 operational telephone sets per 100 inhabitants.

After a slow start, Vietnam's mobile market developed rapidly in the last years with the number of subscribers growing from 120,000 (1997) to app. 870,000 in the first month of 2001 and more than one million later in the same year. The Department General of Posts and Telecommunications (DGPT) estimates that the number of mobile phone subscribers will increase by at least 70% annually over the next few years, and will reach a total of 2.5 million by 2005. At present, app. 10,000 subscribers per week register to mobile phone services. Considering these numbers and the population as a whole, penetration is, however, still low and has just passed 1%.

Table 2: ICT Sector Overview

Market structure	Fixed lines: Monopoly, competition in certain regions and for certain services (long distance calls)
Fixed phone operators	3
Mobile phone operators	3 (licensed 5, incl. CDMA)
Internet service providers	5
Digitisation of the network (%)	100
Number of fixed lines in use (per 100 habitants)	4,007,000 (5.01)
Number of mobile phones (per 100 habitants)	1,000,000 (1.25)
Number of public phones (per 1000 habitants)	30,000 (0.38)
Number of Internet/email subscribers (%)	200,000 (0.25)
Number of PCs per 1000 habitants	8.9 (1999)
Number of public access points to the Internet ¹³	> 400
Local call charge per minute: fixed phone	US\$ 0.02
Local call charge per minute: mobile phone	US\$ 0.11
Average dial-up cost for a month using 30 hours ¹⁴	US\$ 37.3
Radios (penetration rate, radios / household)	0.53 (1997)
TV receivers (penetration rate, % of households)	75% (1999)

Source: ITU, WDR

The technical basis to enable growth in the sector was the development of a country-wide digital backbone network consisting of fibre-optic and digital microwave links connecting it to the Thailand-Vietnam-Hong Kong (TVH) submarine fibre optic cable with a capacity of 560 Mb/s. The availability of the latter triggered an increase of international voice traffic from less than one million minutes in 1988 to an estimated 500 mill. minutes in 2000. On the level of national infrastructure and the availability of services, this basis as well as the sectoral reform resulted in significant improvements in both, the fixed line as well as the cellular services (see Box 1).

Table 3: Performance of the Telecommunications Sector

	1995	1998	2001
Installed fix lines	775,000	2,000,000	4,007,000
Mobile lines	23,500	212,000	1,000,000
All lines	798,500	2,212,000	5,007,000
Waiting time to install a fix line	n.a.	n.a.	n.a.
Installation charge	n.a.	n.a.	US\$ 55
Average cost of a 3 minute local call	US\$ 0.1	US\$ 0.1	US\$ 0.06*
Connections per 100 habitants	n.a.	n.a.	n.a.
Localities with telephones	n.a.	n.a.	85%
Public telephones	850	n.a.	30,000
Digitisation of the network	100%	100%	100%
Optic fibre (km)	n.a.	n.a.	> 1000
Employment by the sector	58,000	n.a.	n.a.

* industry data, 2001

Source: ITU, WDR

2.2.2.2 Rural Connectivity

The development of Vietnam's ICT infrastructure was for long hampered by the absence of an existing terrestrial network for rural areas, which was mainly due to the often mountainous terrain and the existence of landmines. Besides the availability and implementation of new

13 Estimated number of facilities where people have access to the Internet and email services.

14 Including initial subscription fee, monthly fee and call charges.

technological means, i.e. wireless microwave backbone networks, new regulations have been established. These particularly aim at all fixed line telephone operators to contribute to the development of communications infrastructure in rural and remote areas, even though this might not be economically profitable. Such obligations are passed as a decree or government

Box 2: Subsidised Rural Access

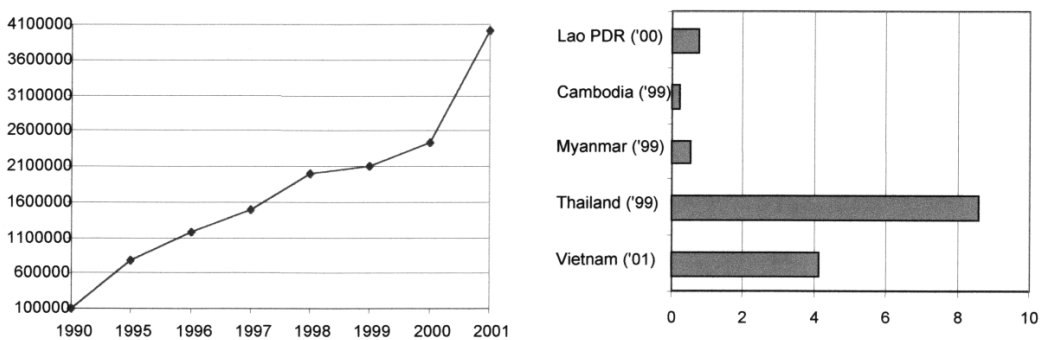
Subscribers who are located in villages that belong to the socio-economic development programme for especially difficult villages in mountainous and remote areas enjoy the subscriber charge of 18,000 VND/set-month, hence 10% below the regular price.

decision and stem from the major objectives of the Vietnamese government to expand ICT services to a wider section of the population and to meet customer demand irrespective of place and time (cf. Box 2). So far, this has resulted in the fact that 7,656 of Vietnam's 9000, i.e. 85%, villages nationwide were connected to the national telecommunication

network. Apart from the local authorities, only few enterprises and individuals have access to a direct line. However, the post offices offer, although at limited opening hours, daily access to public telecommunication facilities. The reported success of informal reselling of either fixed or mobile services can be explained by these limitations.

Graph 1: Developments of Telecommunications in Vietnam

Growth in the absolute number of subscribers to telephone services in Vietnam.
Comparison of teledensity between Vietnam and neighbouring countries in the latest year available.



Source: ITU, AMIC, LTC and DETECON

In terms of spatial dispersion and serving individuals' needs, the mobile phone network already plays an important role: VNPT managed to include all 61 provinces of the country in their mobile phone network by mid-1998. Coverage on the provincial level will remain fragmented until advanced relay systems are operational. The two country-wide available mobile operators set up a roaming agreement in order to provide better coverage to the subscribers on the provincial level. This might be interpreted as one first step to foster cellular telecommunication systems and to leapfrog the fixed line infrastructure installation.

2.2.2.3 The Internet in Vietnam

Just as the Vietnamese telecommunications market, access to the Internet used to be in the hand of state-owned enterprises. For the past few years, the government has been aiming at liberalising Vietnam's Internet market and bringing access charges down to the levels of other countries in the region. Eventually, with Government Decree No. 55/2001/ND-CP on The Management, Provision and Use of Internet Services, coming into effect on September 7th 2001 (cf. VNNIC 2001), a new legislation has been issued to reform the Internet market. The decree is intended for revivifying the development of the Internet in Vietnam because it

abolishes the current monopoly on the provision of Internet services held by state controlled enterprises. The reforms stated in the decree are part of the government's policy to universalise the development of the Internet in Vietnam in order to satisfy the requirements of the course to the industrialisation and modernisation of the country. One particularly important move is the future opening of the Internet Access Provider (IAP) and Internet Service Provider (ISP) markets. Prior to Decree 55, Vietnam Data Communications (VDC), which is a subsidiary of VNPT, was the only IAP in Vietnam. As such, VDC controlled the country's international gateways which all the other ISPs rely on. Furthermore, the constellation that VDC was the only IAP and the market leading ISP at the same time inevitably led to a distorted competition.

Box 3: Limitations to the Internet

The prior limitation will in the long run remain the dominance of English in the world of ICT, or the limited availability of relevant content in Vietnamese. Furthermore, wide spread access to email and Internet services in terms of infrastructure is hampered by the limited availability of electricity and basic telecommunications infrastructure. In the mid to long run these problems will be reduced, provided the ambitious government programmes to roll out both infrastructures are realised.

A limitation that particularly hampers the ICT use of individuals and small firms are the costs for hardware and connection charges. The latter are five to seven times higher than in neighbouring countries in Southeast Asia, and as much as 40 times higher than fees in the US. It is noteworthy, however, that the authorities have reduced the costs of Internet use since its introduction from about US\$ 0.027 per minute to app. US\$ 0.01 to US\$ 0.019.

In order to enjoy such relatively low usage costs but avoiding the high hardware, connection and subscription fees, as well as sidelining the lack of telephone lines, most Internet users are clients of commercial Internet cafés. The latter have spread in all cities and major towns in the country. The fact that VDC customers are able to dial up nationwide at local-call tariffs surely fosters these developments.

To date there are only three additional operational ISPs, all of which are state-controlled and serving a rapidly growing subscriber base: by the end of 1998, there were a little over 11,000 subscribers to a dial-up account, one fourth of which was using e-mail service only. By mid-1999, the figure had already reached to around 40,000 Internet subscribers. The latest, mid-2001 figure provided by VNNIC indicates that there is a total of 159,340 dial-up Internet accounts in Vietnam. On the basis of an estimated 250,000 subscribers by the end of 2001, VDC projects that Internet subscription will almost double each year over the next few years and will reach one million in 2005.

2.2.2.4 Discussing Strengths and Weaknesses¹⁵

As shown in the section above, ICT-related developments in Vietnam progress quickly and, as some of the interviewees expressed it, are in a continuous flow. The developments since the separation of posts and telecom as well as the creation of a telecommunications corporation and a regulatory body should eventually promote Vietnam's competitiveness in South-East Asia and lead to a more liberalised and market driven economy. In light of the ongoing restructuring of the sector and the setting up of various national strategies to promote the broad application of ICT, it is not advisable to provide a road map for German involvement in the country's ICT strategy. On the basis of the information gathered in both the desk and the in-country study, strengths and weaknesses can, however, be identified. A set of proposals primarily formulated by the interviewees as well as some general thoughts may be able to

¹⁵ A tabular overview about strengths and weaknesses is attached to this report.

show directions for potential German involvement. Both, evaluation of the major findings as well as some concrete proposals, will be presented in the oncoming sections.

National ICT Policies and Infrastructural Developments

Provided Vietnam manages to follow its course of economic development and infrastructural improvement, the country in the medium run will probably be one of the few LDCs in which both electricity and basic telecommunications infrastructure are not the major bottlenecks for a widespread diffusion of ICT applications beyond basic telephony. Neither should motivation and literacy level of the population turn out to be the major hurdles.

The most important challenges for the mentioned widespread diffusion are to be found on two levels at least. On the level of the decision makers, i.e. the central committee and the ministries, there seem to be both enthusiasm and reservations, depending on the actors' age and attitude. This ambivalent situation leads to competency conflicts, e.g. between MOSTE and the ministry of education, and eventually hinders the speed of adapting the institutional framework to the current developments. Even bigger problems that were mentioned by almost all interviewees are created by the fact that the middle-ranking officials as well as the political leaders on the district and community level mostly lack awareness and have built up reservations against ICT related developments. Such problems lead to the situation that the strong motivation and a store of good ideas within the younger and progressive public officials are stifled. Their ideas are – if at all – implemented only half-heartedly or with serious time-lags. The absence of local and national civil society organisations, which often are the catalysts for a change of thought with political leaders, surely does not ease the mentioned difficulties. It seems that this situation will not change in the short run and that it may be necessary for internationally operating NGOs to raise more discussion on ICT.

For most households and micro enterprises the prices of both PC hardware and individual access to the Internet or even telecom services are well above their purchasing power. This is particularly valid for rural and remote areas. A further barrier is the fact that basically everything in connection with ICT use requires a certain degree of acquaintance with the English language. Although there are some off-the-shelf software packages in Vietnamese, the lack of a commonly used UNICODE leads to a lack of compatibility between different users and applications.

Generally speaking, the government of Vietnam puts particular emphasis on developing its ICT sector, i.e. the expansion of the telecommunications infrastructure. So far, this has happened in a rather successful manner and even rural areas could be integrated into the telecommunications network. Moreover, the various resolutions, decisions and decrees give national priority to the role of ICT in the public and the private sector, particularly emphasising the computerisation of the government's administration and the growth of the software industry. Beyond that, targets were established in the Master Plan to expand ICT penetration and specific applications, e.g. in the health, the education and the agricultural sectors.

It is argued, however, that over-regulation and the lack of a consistent and non-overlapping ICT implementation strategy does oppress the potentials existent in the country. According to the interviewed experts, this is particularly true if it comes to the limitations the private sector is facing.

Hence, instead of regulating after innovations and change have occurred, the current attitude of the Vietnamese government seems to be to set up rules and standards prior to change.

From the infrastructure side, there is a well developed national backbone infrastructure with considerable capacity and high quality, particularly in bigger towns and cities. The positive externalities that derive from this capacity on the level of the national infrastructure are, however, not yet utilised. On the one hand this holds valid for the diffusion of ICT services in rural and remote areas. Although basic telephony is widely available, any ICT application beyond that is hardly spread up-country. Similar to most developing countries, Vietnam, thus, faces a digital divide on the sub-national level. On the other hand complaints were expressed that the international gateway, solely operated by VDC, does not provide enough bandwidth for the growing number of users and is increasingly becoming a bottleneck.

Human Capacity Development / ICT Education

With the support of the political leaders, ICT awareness has significantly risen since the mid 90s. The rapid diffusion of ICT awareness is basically sustained by a very young population which is comparably well educated and open to change and innovations. The formal education system, however, particularly up to the secondary level, lacks both infrastructure and equipment as well as trained personnel for properly developing this potential.

On the level of post-secondary training the situation gets slightly better, but a lack of quality in IT education and particularly a lack of standardised courses and degrees is prevalent. On a more top-down note, the last IT Master Plan defined that at least 20,000 skilled specialists in the IT field need to be trained, one half of them programmers, the other half system analysts and management staff. This training effort, however, counted rather on the state-owned FPT software company and other, private sector or donor-driven initiatives than on the currently app. 20 IT training programmes available in university education.

If it comes to soft skills, the situation in Vietnam does not significantly differ from any other country. Interviewees pointed out, however, that anonymous interactions over the Net, that is communication without non-verbal factors, is out of thought for most Vietnamese: trust and etiquette can, according to this, only be established and secured through personal interaction. Similarly, most people will not be able to handle the amount of information available through the Net, nor will they all find it useful: finding, selecting and evaluating relevant information requires experience that can only be gained through practice.

ICT Enterprises and Entrepreneurship

As outlined above, telecommunications and value-added services have developed rapidly due to sectoral reforms and openness towards foreign investment and assistance. This is furthermore reflected in the latest IT Master Plan, which primarily focuses on promoting this reform and strengthen the production of ICT related hard- and software as well as services.

Beyond that, hard and software production was successfully supported by the government by establishing BCCs and Joint Ventures and not least by the establishment of High Tech parks offering interesting investment conditions: approximately 70% of the currently around 1,000,000 PCs are actually produced in Vietnam. This already points at Vietnam's advantage of having an important domestic market, which was placed at US\$ 240 mill. in the year 2000,

hardware, software and service sales contributing 80%, 8% and 12% respectively. Moreover, some of the software developing firms went international and acquired contracts from the US, India and Malaysia.

The growing domestic market already indicates that the public and the private sector of the country spark the demand for ICT-related products and services. And even SMEs do start to use ICT for their operations, though still to a limited extent.

Despite these progresses made, the private sector in Vietnam faces various problems.

First and foremost, the limitation of private sector involvement in BCCs and joint ventures in the field of telecommunications is seen as an obstacle to a more efficient development of the telecommunications infrastructure and the services provided. Alike, the monopolistic position of VNPT is said to hamper the decrease of costs, particularly those for accessing the Internet on an individual basis.

Apart from the lack in capital which characterises many of the country's SMEs and hinders the majority of entrepreneurs from acquiring and using IT services, the low level of awareness about the positives that may emerge through ICT application was mentioned by many experts. This might well be a bigger obstacle than the deficiencies in the banking sector and the legal system, which both lack the capacity for electronic transactions. The latter are going to be tackled in the near future with the ratification of an IT Master plan of e-commerce and the adjustment of the institutions of the financial sector to electronic transactions over web pages, which is one priority in the IT Master Plan. At present, this means that the growing number of firms that place information on the Internet are not able to offer transaction capabilities.

The problems in the country which stem from the distribution of non-licensed software packages have positive and negative implications. On the one hand, intellectual property and copy rights are not secured due to the lack of a legal framework or the lack of execution of the few existing laws. This certainly hampers the development of a functioning software market on the level of standard products. Innovations are not protected against piracy which eventually leads to a lack of incentives for R&D. The prices for standard software packages, on the other hand, are prohibitive for individuals and small entrepreneurs alike: the rapid diffusion of IT application, use and knowledge would not have been possible without access to low cost software packages.

Local Content and Applications

There is the awareness with both the Vietnamese government and private sector actors that the key to a widespread and beneficial diffusion of ICT is to provide local content and produce local products, hence to move from a "network centred phase to a content centred one". As mentioned earlier, Vietnam has made significant moves towards the production of hard- and software and ICT-related services.

There is also a number of government related websites as well as those provided by the state-owned and bigger private enterprises. Alike, newspapers that offer their articles online are present in increasing numbers. However, there seems to be a lack of joint efforts in order to set up a proper web portal for Vietnam, although every ISP is basically providing such a portal in varying quality and with selective contents.

The fact that most websites are also available in English already indicates that most of the content addresses foreigners, be they tourists, aid-workers, researchers or actors from the public and the non-profit sector and not least emigrants all over the world. While online information certainly provides insights into the country's developments and has positive effects for the image of the country, which is still often associated with the wars it went through, the concrete impacts on the majority of people's lives may be discussed: impact analyses are at the same time scarce and necessary in order to gain knowledge on this field.

One major obstacle when it comes to local content creation is the lack of standardisation of the Vietnamese script system: a commonly used Unicode system is not yet in place, which creates problems of compatibility between various software packages and on the web. The languages spoken by ethnic minorities are, in addition, not considered at all in the Vietnamese context.

2.2.2.5 Potential Areas of German Contribution

The past has shown that Canadian, Swedish, Japanese and multilateral co-operation was dominating ICT related developments on the donor side. In the present section, Germany's potential contribution will be outlined, based on the information assessed, strengths and weaknesses defined and with particular focus on the many ongoing discussions and proposals that were concretely expressed. In addition, the current activities carried out by German actors from the public and the private sector will be considered, although it was difficult to keep track due to the sheer amount and variety of activities. The issues raised and proposals made will, on the one hand, be grouped into such efforts as aim at structural improvements or impacts restricted in terms of location or sector.

Our considerations will furthermore be centred on the following key areas:

- support for the regulatory agency and increase of rural connectivity,
- human capacity and awareness raising,
- support for private firms, i.e. in the software sector and for SMEs, and
- the provision of local content.

The discussion in this section should be digested with some caution as a huge number of developments are currently on their way; and in light of the IT Master Plan 2001-2005 even more projects and initiatives will be launched. Potential German actors are well advised to assess these latest developments and look for synergies with other donors. Considering the rather centralised administrative structure in the country, this might be a fairly simple task.

Regulation and Policy Development

In order to face the challenge posed by the need for regional and global integration and, thus, to live up to the political commitment made through the ratification of BTA and ASEAN agreements, the government of VNM will need to lift its rather restrictive ICT policies and promote competition and price finding processes. This will create challenges for both, the state owned enterprises and the strategic partners from the private sector players and particularly affect the regulatory body, DGPT and the relevant ministries. Due to the traditionally good relations to Germany and the joint experience of a once separated state and

not least the success of German deregulation policy, support in these processes seem to be particularly welcome.

One concrete output of such a support could be, for instance, to develop a comprehensive and coherent set of national information and communication service laws, similar to the German *IuKDG*¹⁶, which should integrate existing laws and address new challenges such as e-commerce, copyrights, etc.

Moreover, it could be beneficial to support the local efforts to establish ISOC Vietnam. In a society in which local non-governmental organisations *de facto* do not exist, ISOC, as a renowned international NGO, could certainly be a catalyst to express critique and desires related to ICT developments and thus act as a mouthpiece for groups in the society which otherwise have difficulties to make themselves heard.

A concrete proposal for collaboration was made by the DGPT representative. The government body is currently struggling with issues of costing and pricing, interconnection agreements, frequency allocation and quality management. Consultation in these processes are necessary and could, for instance, come in the form of CIM sponsored experts sent to the regulatory body.

Infrastructural Developments and Rural Access

In order to promote universal access and to react to the informal reselling of telephone services as currently occurring in both urban and rural areas, the introduction of a franchising scheme similar to the *Télécentre Privé* in Senegal was discussed with MOSTE representatives as a possible solution for Vietnam. Instead of relying on the post offices, whose daily opening hours are limited and whose number is relatively small, incentives such as attractive loans and franchising regulations for small entrepreneurs to run public call offices (PCOs) could be introduced by both the network operators and the DGPT. The advantage would be that the somewhat illegal reselling of services would be legalised and private micro-businesses could emerge. Over time and according to existing demand, such centres could not only offer TC services but also Fax and Internet. Experiences from other countries show that, in contrast to public telephones, such centres provide the possibility for the population to be called and for messages to be left. Such centres usually become rather interactive places. Implementation would be simple, and it would also be easy to involve donors in this field because of the success in other countries and the well developed state of structural conditions in Vietnam, i.e. the basic infrastructure and the awareness of decision makers. Currently the legal framework needs to be adjusted in order to allow private individuals to sell such services. A licensing agreement to be signed for example between these individuals and VNPT could, however, ease concerns in this respect.

Related to IT and Internet issues is a proposal prepared by some ISOC members to gradually establish a Computer Emergency Response Team (CERT). These teams of IT experts exist worldwide¹⁷ and work on the tasks:

- to assist network and infrastructure operators, particularly in the non-profit sector, in setting up preventive measures to improve the security of the participating sites;

¹⁶ Informations- und Kommunikationsdienste-Gesetz; Bundestags Drucksache BT-Drs. 13/7934.

¹⁷ Information on the German CERT can be found under www.cert.dfn.de.

- to give quick and effective help and information in case of security related accidents (e.g. attacks from hackers, computer worms, etc.);
- to intensify the flow of information between the various CERTs on an international level, aiming at a reliable co-operation.
- to set up collaborations with manufacturers, software distributors and providers.

Human Capacity and Awareness

While attending the ASEM Seminar on Asia-Europe Co-operation on “Applications of Information Technology to Human Resources Development in the Mekong Sub-Region: Challenges and Opportunities”, representatives from the Asian Institute of Technology, Bangkok, which hosted the event, and from GTZ and FernUniversität Hagen discussed potentials for co-operation, basically aiming at a transfer of knowledge in the field of distant education.

Two specific issues were raised.

First, AIT showed interest to use and integrate the open source software CampusSource (www.Campussource.de) for their study programme, i.e. for the setting up and expansion of the ASEM virtual university.

Second, AIT showed particular interest in the multimedia based bachelor course offered by the department of electronic engineering and information technology of FernUniversität. In a pilot phase, the feasibility of such a transfer could be tested. If successful, the contents of the course could be adjusted to the curricula of AIT and integrated in their course programme.

The introduction of a Computer Driving Licence following the model of the EU was a proposal made by the representatives of VCIT, an executing agency of MOSTE. A common minimal standard of IT-related know-how should be compulsory for government and administration officials. This would also help in enabling the private sector to judge on its employees computing know-how. It was, however, stressed that the driving licence should meet international standards, too.

Similarly, the urgent need for a standardization of the classifications of ICT experts was expressed. This would make it easier to judge on the levels of knowledge of people with professional titles such as IT consultant, software developer, application specialist etc.

A project for which the Vietnam Corporation for Electronics Industries (VCEI) seeks partners and that could be interesting in light of GTZ’s focus on vocational training is the establishment of a vocational training centre for workers in the production of Consumer electronics, IT hardware and medical care technology in Hai Phong. A building has already been acquired. The aim now is to set up the training centre’s curricula for both short and long-term courses. VCEI is the biggest (state owned) producer of consumer electronics in the country, comprising 14 companies and one research institute.

In order to address the lack of ICT related training in schools, the Centre of Information Technology, following the IT Master Plan 2001-2005, developed an ambitious proposal for funding its EduNet, which is designed to link all universities, colleges, provincial departments for education and MOET departments. Beyond the provision of infrastructure, i.e. the establishment

of Computer Labs and Internet connection, there is strong awareness that content creation for the school system needs to be in the centre of efforts. Vietnam is currently seeking ways to acquire the financial and human resources to get EduNet off the ground. Germany's experiences with its "Schulen ans Netz" - initiative might at least in some aspects be beneficial here.

Private Sector Initiatives

According to the representative of IFC's MPDF and probably in line with the German government's / GTZ's focus on SME development in Vietnam, there is a necessity to support the existing system of local business development consultants in the country with better means for information gathering and decision making. Established under the umbrella of cooperative associations, or sometimes by the Vietnam Chamber of Commerce and Industry (VCCI) consultation services are available throughout the country to support businesses on the local level.

But these services' efficiency is hampered by a lack of knowledge and human capacity. Given the growing information resources related to all kinds of relevant business information on the national and the regional level, positive impacts are expected if ICT facilities are established in these centres. Beyond the provision of infrastructure, it may well be even more important to develop a basic training package for enabling consultants to use the tools for gathering business related information, e.g.:

- market info,
- technical info,
- business development related info, e.g. particular loans, standards, and training opportunities.

This way, they could become information intermediaries / brokers for local entrepreneurs. The experiences with GTZ's SMEnet would provide a good starting point for moves of this kind.

Institution building efforts are on their way concerning the establishment of a Vietnam Software Association. According to the protagonists of the association, it should focus on the promotion of VNM as a producer of software and an alternative to India and other countries when it comes to offshore development of databases, applications etc. It should, thus, channel the countries software firms to overseas markets, establish contacts and provide financial means to launch a marketing strategy, e.g. through participation in exhibitions such as the CeBit.

Beyond that, another target of the association could be to deal with and support the application of certification standards (as mentioned above), quality control measures, property and copyrights etc.

From the development assistance perspective it might be worthwhile noting that the effort of creating a software association might be a very time consuming and bureaucratic act within the current environment, and that there is certainly a danger that such an organisation would favour big players, like the state owned FPT, rather than small private entrepreneurs.

Content Provision

The relevance of the provision of adequate and beneficial content was outlined above. However, specific efforts of providing relevant information particularly to people in rural communities are

advancing only in a slow way and their sustainability may – in light of the failures of MCTs in sub-Saharan Africa – be questioned. The cultural centres that are currently piloted by the Vietnamese government in order to create information hubs do not yet seem to focus on local content provision. To find out about the latter, but also to judge on the general feasibility of such centres, research is required to identify and document current information needs and communication practices in rural communities. With the results of this kind of research partners could be identified, awareness could be raised and capacity would need to be built up accordingly. Eventually, relevant information from various sources such as the Internet, agricultural databases and guidelines, legal and social support services, etc. could be provided and requested at the centre through an intermediate information broker. A transfer of experiences from the Swaminathan Research Foundation's village information project in Pondicherry, India, would be beneficial and could show a possible way of implementation.

2.2.3 Lao People's Democratic Republic Country Overview

Located in the heart of Southeast Asia, Lao People's Democratic Republic (hereafter Laos) is a landlocked country bordering on Cambodia, China, Myanmar, Thailand, and Vietnam. Laos' landscape is dominated by densely forested mountains, which in the north rise to nearly 10,000 feet above sea level. While forest and hydroelectricity are the most important resources, Laos has also substantial deposits of tin, gypsum, etc. The Laotian economy is predominantly rural and agricultural. Subsistence agriculture accounts for half of the GDP and provides 80% of total employment. About 80% of the population live in rural areas.

Table 1: Country Overview

Capital	Vientiane
Population	5,296,694
% of rural population	80
Population density	22.4 persons / km ²
Currency (US\$ exchange rate)	1000 Kip = US\$ 0.12
Major language	Lao
GDP per capita (PPP)	US\$ 1,476.0
Population below the poverty line	26.3 (1997)
Gini coefficient	0.36 (1997/98)
Administrative structure	16 provinces, 1 special zone (141 districts)
Literacy rate	47.3%
Infant mortality rate	93.3

Source: HDR, WDR

Since the declaration of the New Economic Mechanism (NEM) in 1986, the Government has been transforming its economy from a centrally planned to a market-oriented system. NEM has given critical impulses for economic growth – macroeconomic stability, production growth, the emergence of the private sector, as well as increased foreign direct investment and trade flows. GDP growth averaged 7% between 1992 and 1997, and the Government set the goal to leave the status of an LDC by the year 2020. However, the regional financial crisis attacking the most important counterpart of the Lao economy, Thailand, slowed down the reform effort and aggravated the macroeconomic environment. As a result, the inflation rate was pushed to three digit levels and the currency, new kip, was depreciated at an alarming

rate. The country suffered badly in 1999 and well into 2000, but recent evidence suggests the economy is recovering. Although Laos is expected to regain the momentum for economic growth as the macro-economic situation is improving, lack of infrastructure and shortage of skilled labour are major obstacles to the socio-economic development of the country. With around 25% of its annual GNP derived from donor aid, Laos remains heavily dependent on aid funding from developed nations.

2.2.3.1 Major Developments in the ICT Sector

Until the mid-80s, telecommunications in Laos depended on a few manual or analogue exchanges and short wave transmission links that had been installed in the 1950's. Following the decision of the Government to open up the country's economy, the need for modern telecommunications appeared to be crucial for integrating remote regions to the rest of the country as well as for the integration of the country to the world markets. Since 1986, several projects have been implemented to cater to this urgent need with the support from multilateral and bilateral donors.

Table 2: ICT Sector Overview

Market structure	Monopoly till Nov. 2001
Fixed phone operators	1 (2)*
Mobile phone operators	1 (2 or 3)*
Internet service providers	3
Digitisation of the network (%)	100
Number of fixed lines in use (per 100 habitants)	40,876 (0.77)
Number of mobile phones (per 100 habitants)	12,681 (0.23)
Number of public phones (per 1000 habitants)	255 (0.05)
Number of Internet/email subscribers (%)	3000 (0.0056%)
Number of PCs per 1000 habitants	2.3 (1999)
Number of public access point to the Internet ¹⁸	Above 60
Local call charge per minute: fixed phone	US\$ 0.0057
Local call charge per minute: mobile phone	US\$ 0.019
Average dial-up cost for a month using 30 hours ¹⁹	US\$ 41.51
Radios (penetration rate, radios / households)	0.09
TV receivers (penetration rate, % of households)	6.30

* From the end of LTC's monopoly

Source: ITU, WDR

Table 3: Performance of the Telecommunications Sector

	1991	1998	09. 2000
Installed fix lines	8591	33661	46013
Mobile lines	0	5000	15000
All lines	8598	38891	61268
Waiting time to install a fix line	n.a.	2.1 years	1.7 years
Installation charge (US\$)	100	90.95	38.03
Average cost of a 3 minute local call (US\$)	0.28	0.01	0.01
Connections per 100 habitants	0.16	0.58	0.75
Localities with telephones	n.a.	44 (137)	68 (141)*
Public telephones	7	230	255
Digitisation of the network	12	99	100
Optic fibre (km)	0	0	423
Employment by the sector	620	1075	1140

Source: ITU, LTC and DETECON* as of Oct. 2001, total number of districts in parentheses

¹⁸ Estimated number of facilities where people have access to the Internet and email services.

¹⁹ Including initial subscription fee, monthly fee and call charges.

Thanks to a series of development projects, there has been a marked improvement in the telecommunications infrastructure, as Table 3 shows. By September 2000, the total exchange capacity amounted to 46,013 line units marking a growth rate of 20% per year since 1991. As a result, teledensity per 100 inhabitants increased from 0.21 in 1992 to 0.75 line units in 2000. Despite this development, teledensity in Laos is still below the average – 1.64 lines per 100 inhabitants – of low-income countries (ITU, 1999).

Box 1: Competition & Regulation

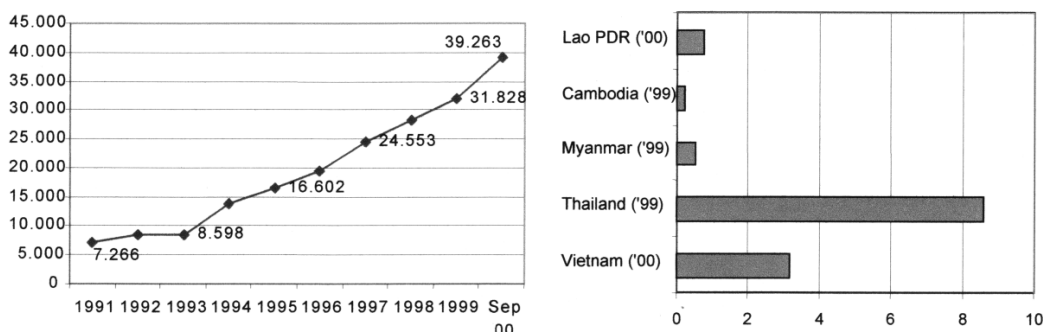
With the end of the monopoly in 2001, Laos is facing competition in the telecom market. The separation of ETL is the result of frustration on the government's side about LTC's inability to carry out their investment plans (US\$ 100 mill. in the first five years, \$100 mill. in the next five years, and \$ 200 mill. in the remaining 15 years). Donors, Japan in particular, were also hesitant to fund this half-commercialised company. The separated ETL retains assets provided by the international donors and is now preparing to compete in the market for fixed line, mobile, Internet and VoIP services. Though LTC may well be dominant in the market for the time being, it has to pay for using its rival's facilities for international as well as domestic traffic.

The regulatory and planning body, the Ministry of Communication, Transportation, Post and Construction (MCTPC), has been playing a stronger role since the foundation of the partly privatised LTC. The current market structure of two competing carriers with entangled facilities requires a more competent and independent regulatory body. According to ADB the regulator's treatment of telecom as a source of government revenue considerably affects regulation. An infrastructure-first approach is likely to overlook potentials for a more efficient utilisation in existing networks and to rather develop new ones.

Entreprise de Postes et Télécommunications Lao (EPTL), a public enterprise to provide postal and telecommunications service, was established under the policy of the NEM in the 2nd 5-year plan in 1986. The government introduced a partial privatisation scheme by forming a joint venture called Lao Shinawatra Telecom Company, Ltd. (LSTC) with Shinawatra Co. of Thailand in 1994. The Lao government held 30% of the share, and Shinawatra 70%. LSTC launched the mobile telephone business. LSTC was transformed into Lao Telecommunications Company (LTC), a joint venture of the Lao government (51%) and Shinawatra (49%), in the form of a build-operate-transfer (BOT) scheme in 1996. By setting up a joint venture with mutual investment plans as a requirement, the government marked the beginning of commercialisation of the telecom sector.

Graph 1: Developments of Telecommunications in Laos

Growth in the absolute number of subscribers to telephone services in Laos. Comparison of teledensity between Laos and neighbouring countries in the latest year available.



Source: ITU, AMIC, LTC and DETECON

At present, LTC is the monopoly service provider offering fixed and mobile telephone, paging (Lao Link), Internet (Lao Internet), text transmission (telex, fax), and short wave

radio communication services. LTC will remain the monopolist until the end of November 2001 and will transfer its network to the Government in 2021. In the case of mobile services, a second licence has already been awarded to a foreign operator, Million International Enterprise of Telecommunication Lao (ETL), which was an organisation imbedded within LTC but separated from LTC in 2000, will compete with LTC in fixed line, mobile, Internet and VoIP businesses from April 2002.

2.2.3.2 Rural Connectivity

The majority of the population live in the rural areas, but they are underserved in basic social services. Telecom service is one of them. In terms of teledensity, Vientiane has 4.5 main lines per 100 inhabitants, urban areas except Vientiane have 1.3 lines, and rural areas have only 0.02 lines. Thus, the rural areas with 61% of the entire population have only 2% of the main lines in operation.

To mitigate the regional imbalance in access to telecom service and to assist rural livelihoods, the Kreditanstalt für Wiederaufbau (KfW) has provided the Laotian Government with an aid funding of DM 44.6 mill. for a rural telecommunications project since 1992. The Rural Telecommunications (Rurtel) Project aims at providing rural areas with basic telecom services such as voice telephony and text transmission. As of October 2001, phase IV is in implementation stage, and 53% out of 128 rural districts have been connected by the Rurtel system. The systems are installed in district capitals that serve as administrative, social and economic hubs in the rural areas. Upon completing phase V by 2004, Rurtel is supposed to connect 73% of the rural districts.

In rural areas where the Rurtel service is available, access to the Internet is possible but with difficulties. Dial-up connection is difficult to be established and the cost is high since a long distance call is necessary. Except a few foreign expatriates, there is hardly any Lao person using email or the Internet in rural areas. There has been no known effort to provide Internet access in rural areas so far, with the exception of a few small-scale initiatives. An example of these is the effort by the International Development Research Center (IDRC), Canada, to assess the feasibility of a community telecentre in Luang Prabang province with a strong focus on piloting rural community access. Another effort for rural connectivity is Jhai Foundation's Phon Mee high school Pilot Project, which has provided a facility with access to the Internet in co-operation with the school, parents and local business leaders. Internet Service Providers (ISPs) are planning to expand their dial-up connection service to regional hubs to cater to local demand. These activities occur in more urbanised rural areas where people at least have electricity and telephone lines. Most of the rural and remote areas without voice telephony and electricity are not likely to gain access to the Internet in the near future.

2.2.3.3 The Internet in Laos

Four years after the first experimental email project implemented by a Lao expatriate at the Lao National Polytechnic Institute (NPI), Laos became one of the last countries in Asia to establish full Internet connectivity when an ISP, GlobeNet, was established in Vientiane in mid 1998. Another ISP, LaoTel, was launched by LTC in late 1999. PlanetOnline, the third ISP, offers a quality service to a limited number of subscribers. Even before the establishment of local ISPs, when only limited email services were available, people sought full access to the Internet through dial-up connections to neighbouring countries, despite the high costs for

international calls. A few international organisations and companies used the Internet by establishing their own private Internet gateway via satellite. Since local ISPs started operation, the ratio of users of local services has been increasing.

Table 4: A Snapshot: The Internet in Laos

ISPs	GlobeNet, LaoTel and PlanetOnline
Number of Subscribed Users	Less than 3000: GlobeNet (640*), LaoTel (2200) and PlanetOnline (11)
PC Penetration (per 1000 population)	2.3 (in 1999)
Number of Public Access Points	above 60
Costs of Use (30 hours / month)	US\$ 41.51

*Source: UNDP and ZEF Survey, * including 40 leased line users*

Recently the Science, Technology and Environment Agency (STEA) under the Prime Minister's Office has planned and implemented the "One Gateway System." The objective of the system is to monitor and regulate all Internet use and activities in Laos by channelling all Internet traffic from and to Laos through the government's gateway. Considering that there has been no explicit regulation of Internet use and ISPs so far, the One Gateway System will be the crucial part of the emerging Internet regulation and policies. Most important, the government will act as the sole Internet Access Provider (IAP) if they abide strictly by the original plan that even all embassies and international organisations will have to use the national gateway.

Internet cafés started to emerge in Vientiane around 1998 and at first mainly served foreign travellers. More recently, however, the number of Lao users has been increasing. Considering that there are less than 3000 subscribed users of private ISPs in the country as of October 2001, the Internet cafés without doubt provide an important means of access for locals who are unable to afford full service. Internet cafés have now gained much popularity among people without Internet access at home, particularly young people. The first cafés concentrated in the tourist centre of Vientiane, near the Mekong riverside, but more recent establishments are near schools. Their Internet connections are provided by GlobeNet and LaoTel. According to a UNDP estimation, there are more than 47 Internet cafés in Vientiane only. Including establishments in other regional centres, the total number of public access points may exceed 60.

Box 2: Limitations to the Internet

In addition to the lack of infrastructure and human resources, one of the challenges regarding the use of the Internet is the lack of awareness and commitment among the highest-level political leaders. As pointed out by one of the forerunners of the Internet in Laos, the introduction and spread of the Internet is a political rather than a technical problem. Starting with the first email service for a limited number of people up to the creation of a joint venture ISP, the Government has very cautiously experimented on the impact of the Internet on Lao people. With the "One Gateway System", the Government is moving forward into a more active role. However, this may have a negative impact on the development of the Internet, which has so far been led by the private sector.

2.2.3.4 Discussing Strengths and Weaknesses²⁰

As one of the least developed countries (LDCs), Laos has many other socio-economic development agendas besides ICT development. Due to the potential benefits of ICT, however, the government becomes aware of its importance. Recognising that they are left behind compared to other, neighbouring countries, Laos is now trying to catch up with others

²⁰ A tabular overview about strengths and weaknesses is attached to this report.

and exploit the new technologies for their socio-economic purposes. Against the background given in the previous sections, this part will discuss the strengths and weaknesses of various aspects of ICT development in Laos. Since many activities are in progress or in planning stage, it is often difficult to determine whether a certain movement will have positive or negative impacts. For those activities, it has been tried to identify opportunities and threats.

National e-Strategies and ICT Policies

The government has recognised the necessity of formulating national strategies or policies concerning ICT and the Internet, in particular with the ICT Master Plan suggested by STEA as early as 1996. After 5 years of consideration and trial, the government seems determined to assume a proactive role in the development as is reflected by current movements like the new Master Plan, reorganised LANIC, etc. External influences from ASEAN and donor agencies have contributed to the changes in the government's attitude as well. Practical requirements for efficient communications with the ASEAN partners as well as the needs for ICT development envisaged in the e-ASEAN agreement allowed the government to realise that the need for ICT overrides potential threats. e-ASEAN initiatives are to facilitate those commitments since they aim at a level ground for e-commerce within the region. While Laos may not fully benefit from e-commerce in several years to come, it is sure that participating in the process will allow Laos to set up a legal and institutional framework compatible with the regional standard. Another opportunity is the global trend of increasing activities of donor organisations in ICT development. UNDP in Laos put more emphasis on ICT than ever, preparing several project proposals. Many development projects that do not aim at ICT development have ICT components in some form. Inclusion of ICT components in development projects will increase more and more in the future.

In spite of these perspectives for future development, there are many challenges to be addressed. The infrastructure-first approach within the government may result in an oversupply of network capacity with few applications utilising the capacity. Especially at the beginning stage of the ICT master plan formulation, awareness and vision of policy makers are vital. Consideration on what kind of ICT applications will be used or needed in which sector must precede the choice of technology²¹.

In addition, lack of coordination and increasing competition among authorities delays policy-making processes. The Lao National Internet Committee (LANIC) was established combining several ministries' responsibilities for the control of the Internet, but due to the competition for the leading role among the ministries, it has been ineffective in policy making and legislation as well as regulation. Competent regulatory bodies, an appropriate legal framework, more coordination, stronger enforcement of regulations, and effective implementation of policy are still required.

Infrastructural Developments: Connectivity and Accessibility

With less than 10 years of modern telecom history, Laos has a poor telecom infrastructure compared with other low income countries. Teledensity has been improved considerably in the urban areas but most of the rural areas are still unconnected. Although there are other

²¹ Infrastructure is a critical component in ICT development but it is not the goal in itself. The current approach of MCTPC and JICA puts the emphasis on (telecom) infrastructure development, and the ICT master plan is said to come after the telecom master plan. However, without identifying the actual needs now and in the near future, such an approach may end up with oversupply or waste of resources.

solutions, electricity is a prerequisite of telecom infrastructure. Only one quarter of the country – highly populated areas – is electrified. The existing backbone should be expanded to serve the increasing need for voice and data communication. To meet the demand, tremendous investment is required, but local financial resources are scarce and foreign private investments are not attracted by the market, which results in the dependence of infrastructure development on donor aid.

While the lack of physical infrastructure will continue to pose problems in connectivity and accessibility, some of the latest developments are likely to relieve the situation. The CSC project, ETL's ten year plan, and ADB's regional telecom backbone projects are examples for this. Designed to cater for the regional demand for voice and data communication, those fibre optic networks will make Laos a network hub. As discussed in the previous part, however, these developments need to be reconsidered – if this was not done before – to decide whether they are technologically appropriate for the current and future needs of the people.

Human Capacity Development / ICT Education

With a poor performance in the education sector compared to neighbouring countries, Laos has put the priority of its national development and poverty reduction strategies on education and human resource development. Not to mention the current shortage of skilled workers in the ICT field, the lack of skilled human resource will pose a tremendous obstacle to ICT development as well as the national development in general for a longer term. ICT education has two aspects: ICT applications for education and education on ICT.

As tools to deliver information and knowledge in a timely and less costly manner, ICT can offer great opportunities for the education sector. Lao students and teachers in particular will gain substantial benefits from ICT applications because there is a general lack of qualified teachers and teaching materials. The vast store of information and knowledge available on the World Wide Web would be the ultimate resource for people who want to learn about up-to-date skills and technologies. However, due to the low penetration of computer and the Internet, the benefits are not realised. Besides the lack of physical infrastructure such as computers and networks, low proficiency in English is singled out as a problem in people's use of computers and the Internet. Against all odds, some international NGOs have commenced pilot projects to realise the benefits of ICT in education. Though evaluation of the pilot projects would be necessary to determine their effectiveness, such approaches are worth noting as the government's top-down approach will delay ICT diffusion on the school level.

The availability of education and training on ICT is very limited both in contents and geography. Most courses offered by public and private institutes teach basic computing skills such as using operating systems, word processing, data base building, etc. Much needed skills like networking, operating and maintenance of networks and PCs, programming, etc. are taught by a few private institutes, but specialised courses are very expensive. These courses are only available in the capital and a couple of provincial capitals. Teaching materials and qualified teachers / trainers are scarce. Public education needs to upgrade the teaching staff and improve curricula on ICT, and a new faculty focusing on ICT will be created in NUOL. Since poor operation and maintenance often end up with state-of-the-art but unusable facilities, technicians with up-to-date knowledge and skills are much needed. Since there is only a limited supply of skilled workers, obtaining ICT related training and education is quite rewarding. In general, however, technical training is regarded as inferior to

academic training and this perception leads brilliant young people to pursue higher education leaving the demand for skilled workers unmet.

ICT Enterprises and Entrepreneurship

Being a transition economy with abundant natural resources, low wage rates and unmet demand, Laos offers room for growth. In spite of movements to transform the economy from a centrally planned to a market oriented one since the New Economic Mechanism (NEM) of 1986, however, Laos is still a novice to market economy and its entrepreneurship development is in a poor state. Poorly developed market institutions and uncertainties pose serious obstacles both for local business people and foreign investors.

The telecom sector is growing fast compared to other sectors in Laos due to the excess demand for communications and the commitments of telecom companies / the government supported by donors. Recent telecom infrastructure expansion projects will provide higher capacity for various applications – in particular for the Internet. The separation of ETL will definitely contribute to network expansion, which has been much delayed so far. However, the overall impact on the market efficiency is not sure yet. ETL's market entry may impede LTC's reaction to the changes in the market environment by increasing LTC's costs from interconnection fees.

Minimum regulation – or no regulation – on ISPs, Internet cafés and Net2Phone services has boosted the use of the Internet among local people. At present, authorities are in the process of drawing up a new market structure by introducing regulations on ISPs and Internet use. These regulations may hamper the development of Internet related activities in Laos. Concerns over the One Gateway System are high among ISPs not because they oppose to its information control aspect but because it will phase out the competitive environment which has enabled the market growth so far.

E-business is a very new concept in Laos, and therefore, it is difficult for businesses to identify its potential benefits. Overall Internet access is too low to justify the investment required to establish e-business operations. In addition, there is a definite lack of expertise and experience. The banking system is not developed enough to support e-business practices. Despite all these obstacles, there are a few cases of successful e-commerce practice – mainly in tourism and handicrafts. Current activities are targeting foreigners and will continue to do so until B2B e-commerce is in place for local and regional businesses.

Local Content and Applications

Local software development is restricted to the banking system and accounting programmes. Most databases are built for specific purposes by ministries and organisations, and they are often not compatible. There are some local contents on the Internet, but the majority of them are in English and limited to general information on the country and tourism. Contents in the Lao language are scarce. People usually use the Internet for communications – email, messaging and Net2Phone – and entertainment. Since most TV programmes, films and music in Laos are from Thailand, Thai entertainment sites are very popular. To preserve Lao tradition and promote its culture, it is urgent to develop local contents. Contents in Lao are also crucial for the education and the health sectors. The biggest obstacle in local content development is the Lao character set. There is no accepted standard for language encoding so

that the exchange of textual data is often impossible across computers if they are using different character sets. Another issue hindering the development of local applications and contents is the low awareness of copyright and intellectual property right. This will remain as a disincentive to local as well as foreign software developers who may be willing to develop software and contents in the Lao language otherwise.

It is a notable development that more Lao web sites have become available recently. A few ministries and several businesses have their own websites providing information services though they are in English and the provision of information is only uni-directional.

2.2.3.5 Potential Areas of German Contribution

General Issues

Considerations on the needs expressed by stakeholders as well as weaknesses and strengths identified in the previous part lead to the following issues to be addressed:

- raising awareness of the benefits of ICT among highest-level political leaders;
- strengthening the regulatory body;
- coordination among ICT related activities within the government and among donors;
- supporting human resource development;
- establishing ICT standards – Lao character set, network, software and computer standards for compatible computing;
- local contents development;
- rural connectivity;
- encouraging local ICT firms to be effective partners.

Concerning the first issue, there has already been some progress among the top leaders, and as ICT spread within and outside the government, the awareness of the benefits and opportunities will be recognised further. The regulatory body has already been assigned, and some donors, JICA in particular, are involved in the efforts to establish regulations and policies. UNDP has proposed to play a coordinator's role. In these areas, German development co-operation agencies have a general role as monitors and collaborators. From the perspective of the Lao government and people, however, support for human resource development, standard setting and rural connectivity should be the focus. In pursuing these purposes, local ICT firms can also be supported in the form of private sector participation. Considering that German agencies put the emphasis on education, rural development and natural resource management, current German operations can be evolved in line with ICT components.

Human Resource Development

As pointed out in the previous part, human resource is and will be a critical factor in ICT development. Focusing on theoretical and mathematical aspects of computing and programming, ICT related education on the tertiary level is inadequate for meeting the needs of society. There will be a major breakthrough in university education once the proposed Faculty of Information Technology is in place. However, the real needs right now and in the future will be for skilled personnel with the capability of proper operation and maintenance.

GTZ has been playing a role in the field of education and currently has several ongoing projects especially for non-formal and vocational training. One of them is the Lao-German Vocational Education Training System Advisory (VESTA) Project, which since 1999 has been aiming at supporting technical / vocational schools in Laos. The programme does not have ICT components for education / training although there are several potentials for the integration of ICT according to the project manager.²²

While these components will strengthen the vocational training programme, more ICT-oriented courses can be added. For the proposed ICT training, the following components should be considered:

- Training period
 - It will depend on the scope of the curriculum, but should not be long
 - After the training period, there should be retraining sessions on a regular basis for the acquisition of updated technology
- Curriculum
 - It should fill the gap existing both in public and private education
 - It should be customised to the local needs
 - Combination with some internationally accepted certificates should be considered
- Recruiting qualified trainers
 - From local people
 - From Lao expatriates / students trained abroad
 - From neighbouring countries (e.g. Thailand for lower language barrier)
 - From German partners²³
- Partnership
 - German partners from similar training institutes to collaborate online and provide certification
 - Local partners from local ICT businesses

Another German project, the HKW-LNCCI Partnership Project, has helped handicraft enterprises enter e-commerce by providing advice and technical support²⁴. The project is almost in the last stage with only a consolidation phase of 2 years left. As the demand for ICT – web catalogue and email – is increasing among the member entrepreneurs, training needs have been identified. What would be useful is a course which combines elementary computing skills with basic English. This could be expanded into an entrepreneurship development programme also including language and computer skills.

²² Communication and information point at Vocational Education Development Centre with Internet access and email, Co-operation with UNEVOC via Internet (international network of VE institutions), Management information system connected with MoE's central MIS, and Computer facilities in VETS (for the training needs of students, teachers and staff and management).

²³ DED already have some workers for training and maintenance.

²⁴ The Partnership Project between Handwerkskammer Koblenz and Lao National Chamber of Commerce and Industry aims at promoting private sector business through institution building and strengthening. A web page for handicrafts sales is available.

Standards and Local Contents Development

Standards are important for Laos to develop ICT in a harmonious way. There are many projects using different software and configurations which end up in non-compatibility. Especially a standard character set is urgently necessary as it would be the basis for contents in the Lao language. Currently, not many databases are available, but once the government Intranet system is in place, there will be a huge demand for databases, which should be shared by various ministries and agencies. Recognising the problem, UNDP suggested a workshop for discussion on a Lao character set. They also recommended the Unicode as a standard. The workshop has not taken place yet. In addition, other related standards – network, software and computer standards for compatible computing – should be set in. For the purpose, the ICT applications which are used in Laos and their compatibility should be thoroughly studied. Once such a study is done, the results can be used as reference for the government to decide on standards.

Contents are as important as hardware and the network. In a country where books and references in print are often expensive and not readily available, CD-ROMs and materials on the Internet can be very useful. Recently, a CD-Rom containing Lao laws was distributed to government offices on the regional level to prove its convenience. As computer penetration in schools is very low, content development should focus on training materials for trainers / teachers and for government officials, who have to come to the capital for training, spending days for travelling. Useful contents in other areas should be identified in co-operation with local partners from various fields.

Rural Connectivity

Provision of connectivity in rural areas is a formidable task in Laos, but it should be done since basic telecom services are not a luxury but a necessity which assist rural people to improve their livelihood. KfW since 1992 has been supporting the rural telecommunication development in five phases. Currently, Phase VI is under discussion, and once decided the rural telecom project is expected to cover 100% of rural areas in Laos. Though ZEF surveys in the rural areas in 2000 show there is hardly any demand for the Internet or email among rural people, it cannot be concluded that the rural population would not benefit from the Internet or email before they experience the technologies. Nonetheless, it is obvious that the rural populace cannot realise the benefit fully as there are lots of obstacles such as lacking literacy and computer literacy. Considering the fact, rural connectivity in terms of voice telephony should still be promoted. In areas where stable electricity and telephone connections are available, a telecentre with Internet connection can be installed. In order to be sustainable as well as relevant in the local context, provision of Internet access should be decided based on prior assessment of the rural residents' needs. Appropriate technical options can be determined according to the need assessment.

2.2.4 Uganda Country Overview

Uganda is endowed with substantial natural resources, i.e. rich soils and a favourable climate in large parts of the country as well as mineral copper and cobalt deposits. Over 80% of the 22 mill. inhabitants of the Republic of Uganda are employed in agriculture; coffee being the

main export crop makes it one of the largest coffee producers in Africa. The agricultural sector increasingly gets involved in tea, horticulture, cotton and maize industry. Uganda's per capita income comes to app. US\$ 1000 per year making it a least developed country. About 55% of the population in Uganda live below the poverty line. In 2000 the trade balance brought about a deficit of app. US\$ 81 millions and the country accumulated external debts to as much as US\$ 4 billion.

Table 1: Country Overview

Capital	Kampala
Population	22,063,000
% of rural population	85,8
Population density	110,5 persons / km ²
Currency (US\$ exchange rate)	1000 USH = US\$ 0.61
Major language	English
GDP per capita (PPP)	1,223.0
Population below the poverty line	55%
Gini coefficient	0.37
Administrative structure	45 districts
Literacy rate	66.1% (1999)
Infant mortality rate	83 (1999)

Source: HDR, WDR

Beyond these alarming figures, Uganda lately experienced regionally restricted but severe famines which made government-led efforts to stabilise the economy and foster market development an even more pressing issue. The basis for those stabilising efforts was laid after Museveni took over power in the East African country in 1986. Advised by foreign countries and international agencies, efforts of economic restructuring targeted the high inflation rate and aimed at boosting production and export earnings. In terms of economic policy, the government ever since has been following a hands-off approach and enforcing the privatisation of formerly state-owned entities, foreign investment, private entrepreneurship and trade liberalisation. As a result of these reforms and infrastructural improvements, economic figures improved and growth in the 90s averaged around 6-7% per annum.

2.2.4.1 Major Developments in the ICT Sector

A monopoly of Uganda Posts and Telecommunication Corporation (UPTC) existed until the mid of the 90s, which was characterized by – for many LDCs almost classical – insufficiencies such as a prohibitive US\$ 1000 payment to obtain a telephone line and a waiting period of up to one year as well as very low penetration of services outside urban areas (cf. Table 3).

In accordance with the overall economic reforms the Uganda Communications Act was then passed in the year 1997. Central aims of this act included to increase teledensity, to improve telecommunications facilities availability and quality as well as open the market to a variety of new telecommunications services. It was the further aim of this act to serve the huge unmet demand and increase the geographical distribution and coverage of the services.

Key targets that were pursued in the context of the sector reform were the increase of digitisation to at least 75% and a massive increase of the call completion rate. As far as the quantity of provided services is concerned, an increase of subscribers to at least 300,000 lines by 2002 as well as the diffusion of the service throughout the country, particularly to the 45 districts and numerous sub-counties, was targeted.

Table 2: ICT Sector Overview

Market structure	Fixed lines: duopoly; Mobile: competition; Internet: competition
Fixed phone operators	2
Mobile phone operators	3
Internet service providers	7
Digitisation of the network (%)	> 90.9*
Number of fixed lines in use (per 100 habitants)	60,000 (2001)(0,26)
Number of mobile phones (per 100 habitants)	250,000 (2001)
Number of public phones (per 1000 habitants)	1380 (0.06)*
Number of Internet/email subscribers (%)	25,000 (0.001)*
Number of PCs per 1000 habitants	2.5*
Number of public access points to the Internet ²⁵	40
Local call charge per minute: fixed phone	0.03 US\$
Local call charge per minute: mobile phone	0.03 US\$
Average dial-up cost for a month using 30 hours ²⁶	9.15 US\$
Radios (penetration rate, radios / households)	1.18 (1997)
TV receivers (penetration rate, % of households)	4.66% (1998)

* 1999

Source: ITU, WDR, Industry Sources

Table 3: Performance of the Telecommunications Sector

	1995	1998	2001
Installed fix lines	38,972	56,919	60,000
Mobile lines	1,747	30,000	250,000
All lines	40,719	86,919	310,000
Waiting time to install a fix line	n.a.	1.5 years	n.a.
Installation charge	n.a.	n.a.	US\$ 285.48
Average cost of a 3 minute local call	0.2 US\$	0.2 US\$	US\$ 0.09
Connections per 100 habitants	n.a.	85,077,048	n.a.
Localities with telephones	n.a.	n.a.	Coverage by mid-2002 83.3%
Public telephones	693	1,333	n.a.
Digitisation of the network	64.2%	90.6%	> 90.9%
Optic fibre (km)	n.a.	n.a.	n.a.
Employment by the sector	1324	1890	n.a.

Source: Industry data, ITU; WDR

Ways of achieving these goals were the issue of a licence for a privately owned second national operator (SNO) to immediately introduce competition with UPTC, with both operators offering full range of services, including fixed line, mobile, long distance, and Internet. In order to secure returns of investment and planning the two national operators were awarded exclusivity of service until 2005. Another means to enhance efficiency in the sector was the reduction of the government's direct role as an operator and the minimization of all subsidies channelled through the GOU and the regulatory body respectively. The establishment of the latter, called Uganda Communications Commission (UCC), has been a key factor in developing and implementing Uganda's liberalised telecom policy.

The Communications Act created the UCC in 1998 and empowered the entity to issue all kind of licences in order to regulate and inspect telecom operators, and to develop ICT services further, particularly beyond the few urban centres.

As a result of these reforms, the GOU, namely the responsible Ministry of Works, Housing and Communications, awarded the SNO licence to the South African Owned MTN (Mobile

25 Estimated number of facilities where people have access to the Internet and email services.

26 Including initial subscription fee, monthly fee and call charges.

Telephone Networks). Furthermore, the Act paved the way to privatising UPTC starting with the separation of the state owned company into Uganda Telecom Limited (UTL) and the postal service (with the latter remaining in public ownership). In June 2000, 51% of UTL was sold to an international consortium. Major results of these processes are summarized in Box 1.

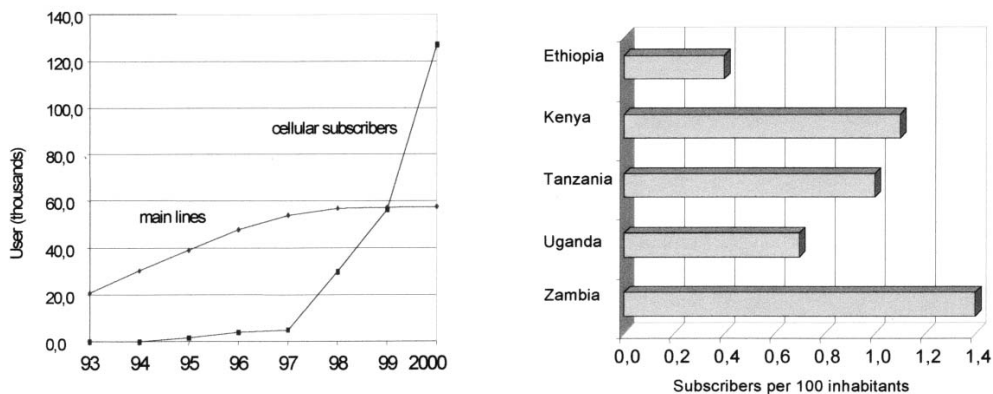
Box 1: Privatisation Results

The fact that MTN was granted a licence before the former monopolist was privatised and, thus, endowed with financial and human capital led to the somewhat exotic set-up that the second operator outweighed the former incumbent. Graph 1 shows the development of the network expansion during 1995-2001 with a compound aggregate growth rate of 45% in subscribers. The figures also show that in the same time span the absolute amount of UTL fixed lines did not increase significantly. A reason for this was the digitisation of the existing network as well as the current focus on the development of the wireless systems in place. In terms of coverage it seems at the present stage that both operators were able to cope with the obligations.

The quality of services provided by UTL was low in 1998: the call completion rate was 20% and thus below the LDC average. A reason for that was the old fashioned technological set-up, which combined switch technology of the colonial era with latest digital technology equipment. Nowadays almost all the switching capacity is digital and although no concrete figures are available, it is justifiable to expect a much better completion performance.

Graph 1: Developments of Telecommunications in Uganda

Growth in the absolute number of subscribers to telephone services in Uganda. Comparison of Teledensity between Uganda and other African countries in 2000.



Source: ITU

2.2.4.2 Rural Connectivity

Up to date, rural areas are chronically underserved but change has gained momentum since the restructuring of the sector in 1997. In most parts of the country and speaking of voice telephony alone, the two national telecom operators are expanding their services. This is currently less driven by the licence obligations but rather by the high returns on investment that are expected. Due to political conflicts and to a high degree of remoteness and poverty, the majority of the north and northeast regions will, however, not be adequately served by MTN and UTL. The UCC expects that about 200 of the total 930 sub-counties will not be

covered, leaving 1/6th of the whole population without connectivity to the TC network. To address this problem, UCC has imposed two additional requirements on the telecom providers: first, MTN and UTL must serve all sub-counties for which they were awarded licences between 2000 and 2002. Second, MTN and UTL must, by mid-2002, point out all the sub-counties that they are not intending to cover in the long run. UCC will encourage bids for licences from telecom providers who apply to go to unserved sub-counties.

An important instrument to make the latter mechanism viable is the Rural Communications Development Fund (RCDF), which is currently being established. One target of this fund will be to economically support investment and maintenance costs of providers who obtain licences for unserved areas. Likewise, preferential interconnection agreements with the other operators to lower access costs for the subscribers will be worked out.

From a broader perspective, the support of such rural universality goes in line with the GOU's development programmes and initiatives aiming at the promotion of socio-economic development in rural areas. These include the Poverty Eradication Plan, the target of universal primary education, the rural electrification and transformation project, the Uganda Information Infrastructure Agenda led by Makerere University, the Plan for Modernisation of Agriculture and the improvement of the health services.

Box 2: Limitations to the Internet

Widespread access to email and Internet services is – from the infrastructural viewpoint – furthermore hampered by the limited availability of electricity outside the urban centres and by the fact that the telecommunication infrastructure in place is mostly GSM based, which does only allow data transmission at 3000-9600 bps and might only be sufficient for POP based email services.

Other, maybe even more important hurdles to the use of information and communication technologies going beyond voice telephony are, disregarding the prohibitive costs of hardware, high subscriber costs, the high degree of (computer) illiteracy as well as the lack of appropriate content available.

The most common means to bridge these constraints is the setting up of so-called multi-purpose community telecentres (MCT); e.g. the UNESCO, IDRC, ITU and UTL supported Nakaseke MTC (www.nakaseke.org). There are other, similar centres in Buwama and Nabweru, which are run under the ACACIA initiative and were implemented by UNCST. All have in common that they cannot be run on a sustainable basis and evaluations of the economic, social and cultural impact of those donor driven activities have been rather negative in the past.

2.2.4.3 The Internet in Uganda

It is difficult to obtain concrete figures of Internet users in most developing countries due to the fact that the vast majority of those users do use Internet cafés or other forms of public access. The currently 8000 service subscribers contain businesses, public and international agencies and their staff and only few individuals. In 1999 the estimated number of Internet users was 25.000. Provided a rather steady growth, this number should – towards the end of 2001 – be closer to 40,000 or 0.2% of the population.

Most of the 8 ISPs on the market provide Internet/email access exclusively in Kampala. Internet/email subscribers outside Kampala have to make “national” calls to connect to their ISP's access point, which makes these services even more expensive. In this context, the need is often expressed to provide universal low cost dial-up email/Internet access in all parts of the country at affordable costs by installing POPs in all districts in Uganda. While this seems to be feasible in technical terms through the national microwave backbones installed by the 3 major providers, the small numbers of customers that can be expected in the short to mid run would make local access subject to at least temporary subsidisation.

Public access, as is provided by Internet cafés and privately or NGO-run telecentres by offering telephone, fax, email, internet, computing, and photocopying services, is very scarce outside the capital city. Within the latter, app. 25-30 privately run centres exist.

2.2.4.4 Discussing Strengths and Weaknesses²⁷

So far a snapshot of the changes in the ICT environment of the Republic of Uganda was provided. These changes became apparent over the last 6 years or so and surely present new opportunities and challenges to development assistance. It will not be possible to provide in-depth recommendations pointing at appropriate strategies of ICT policy and investments. On the basis of the findings, strengths and weaknesses can, however, be identified and a set of guidelines as well as recommendations will be formulated which may help German development co-operation to find its way in the field of ICT promotion. This section will now outline the basic findings and evaluate them in order to eventually express recommendations for action.

National ICT Policies and Infrastructural Developments

In line with its national privatisation and market liberalization efforts the GOU has, since the mid 90s, created a liberalized ICT policy and regulatory framework. This framework has generated a competitive environment in which the private sector participated and which attracted foreign investment. Such investment along with steep price reductions have first and foremost sparked market developments around voice telephony, be they realised through mobile, fixed mobile, fixed or wireless broadband connection. Consequently, Uganda's telecommunications network has grown significantly at a connectivity growth rate of more than 40% p.a. between 1996 and 2001. This also uncovered the still prevalent and huge demand by the population in most parts of the country and across all levels of society. As in many other developing countries, most of these developments are concentrated in Uganda's urbanised areas and particularly the capital city of Kampala. Rather atypically, however, the rural areas are not only potentially covered by licence obligations and political commitment but have started to benefit in real terms from an ever increasing network coverage.

In order to discuss the challenges that arise around the issues of policy formulation and infrastructure it is important to distinguish infrastructural developments from value added, i.e. Internet related services on the other side.

Negatives related to infrastructural developments which could be assessed are:

- the still very expensive connection charges and the high prices of mobile cellular hand-sets; both hinder the majority of people to own and use telecommunications services on an individual basis;
- vandalism against infrastructure facilities, i.e. fixed lines, GSM base stations as well as theft of hand sets;
- the limitation to market driven coverage that will presumably leave up to 20% of the population, particularly in the Northern regions, without any telecommunication whatsoever;
- the inability of the regulatory authority, particularly expressed from the NGO side, to provide sound leadership in facilitating a more enabling environment for ICT infrastructure development for the smaller actors; it was argued that the UCC is reacting to the desires of

²⁷ A tabular overview about strengths and weaknesses is attached to this report.

the two sole operators rather than to the needs of a fair competitive environment (particularly related to the VSAT licensing);

- the fact that mobile technology leapfrogged fixed line developments and that this infrastructure does not per se allow using Internet applications at reasonable quality and speed; these applications will be bound to public access points that maintain expensive point to point broad band wireless access or requires an – on the mid run rather unlikely – upgrade of the mobile network (2.5 or 3G mobile network, i.e. GPRS or UMTS).

Generally speaking, the country's market driven approach to ICT has also contributed to the spread of Internet related services. The market is, however, characterized by prohibitive prices to subscribe and use the services even for the Kampala middle class citizen. On the other hand, the public access market is dominated by such low prices that many believe that entrepreneurs are hardly making profits and will not sustain themselves in the long run. There is furthermore an almost confusing number of development assistance activities that aim at all kind of activities: basically none of them have been in place for a sufficient length of time to allow proper evaluation.

A lot of those activities seem, however, to be quick fix solutions for implementing applications and services without obtaining a proper long term strategy and relevant content. Examples in this respect might be

- the Leland initiative which provided the GOU and the parliament with a LAN and high speed access; the huge capacity of the latter is not sufficiently used. Content wise, web pages were set up which have limited relevance for the general public but rather serve the international scene as a basis for information and a demonstration of transparency and democracy;
- the web pages of the public, the private and the NGO sectors, which are not well maintained and usually provide not more than a shiny surface leading to many bugs and empty pages after only a few clicks;
- the creation of white elephants as the MCTs that serve, in the mid to long run, as not more than researchers' playground and usually fail any evaluation of sustainability; this does, however, not imply that they are not creating benefits on the level of individual communities or households;
- the World Bank's distance education centre, which clearly addresses professionals from the government or development co-operation to attend courses that are entirely designed outside the country. Beyond such training, the centre is used for high level videoconferencing sessions. As soon as it comes to the inclusion of a broader public the facility fails. Moreover, its subsidised training courses and Internet cafés distort the local private sector activities.

These examples are not comprehensive in their nature but should indicate the problems identified by the in-country experts. According to the latter, the general lack of co-ordination and even rivalry within the government for funding is prevalent and needs to be addressed urgently.

Additionally, corruption within the government and government related bodies was mentioned as hampering adequate decision making on the basis of the legal framework. The market development as such seems, however, not endangered. There also seems to be no preferential treatment of the former incumbent as compared to MTN, the SNO. An additional

advantage of Uganda that attracted foreign investment and that is reflected in the ICT sector's overall performance is that the political structures are stable and democratisation is proceeding. This makes the country – along the line with Ghana, Senegal, and Tanzania – one of the few African show-cases of development co-operation.

Human Capacity Development / ICT Education

A definite strength when it comes to this issue is the government's commitment towards the creation of a knowledge-based society and the existence of a motivated and knowledgeable young urban population, which builds a potential for a significant workforce. Otherwise, the structural problems of the formal education system need to be taken into account and make political commitments towards a knowledge or learning society look over-ambitious if not unrealistic.

Most ICT related developments within the formal education sector are either donor financed or co-sponsored by NGOs and/or the private sector or its foundations (e.g. the Bill Gates Foundation). The private sector also plays a key role when it comes to the provision of ICT training courses in terms of both the application of software packages and also software and database development. Although such efforts provide technically the most sophisticated know-how, prices are too high. Low cost offers exist, but mostly provide uncertified training that is often insufficient in terms of training material, teaching personnel and overall standard.

Be it on the school, the university or the professional level, outdated equipment and the lack of qualified teaching personnel, if at all available, is the rule rather than the exception. Those exceptions are donor financed institutions which target the urban elite and seem to widen the already existing gap between the couple of top universities, colleges and private schools and the remaining majority of education related facilities in the country.

ICT Enterprises and Entrepreneurship

On the supply side, the privatisation and liberalization of the market attracted new firms to enter the market but also created entrepreneurship and employment on various levels from the two big operators to the ISPs down to Internet cafés and the informal resale of airtime.

For the businesses themselves, major improvements occurred with the reduction of prices and increase of accessibility of telephone services. Concerning IT and Internet applications, it seems that both supply of hardware or software as well as the private sector's demand for such services is very limited and by all means restricted to the Kampala conurbation. Apart from the banking sector and multinational corporations, most ICT related activities by the Ugandan private sector are limited to awareness raising programmes and member databases of industry and trade associations. Most of the latter also maintain web pages, which are, however, of limited use for their members and mainly serve as PR.

Local Content and Applications

There is a lot of eagerness from the GOU-side to provide local content in terms of both soft- and hardware and information supply. However, the serious lack of qualified people, investment, financial resources and entrepreneurial initiative have up to now prevented this eagerness from becoming effective.

Content wise the ever increasing amount of web pages from all sectors does raise hopes for the future although the current technical and content-related quality is far from satisfying. Given the small domestic market of app. 40,000 Internet users, this may not be surprising. The most professionally designed and probably the most visited are those web pages that offer information for Ugandans abroad, i.e. daily newspapers.

2.2.4.5 Potential Areas of German Contribution

General Issues

Since its commitments towards trade liberalization and structural adjustment, Uganda has enjoyed a great deal of international development co-operation. This also applies for the activities involving ICT. The detailed description of such activities goes beyond the scope of this report. The major fields in which most ICT related activities of foreign development assistance are currently undertaken are:

- the support of the regulatory environment and the creation of the RCDF;
- the development of infrastructure,
- the increase of access to and use of computer applications in schools and universities,
- the development of human resources and electronic distance education applications,
- the supply of information about pressing health problems,
- the provision of local content by government agencies, associations, NGOs and the private sector.

However, the activities of the different donors and NGOs are currently overlapping to a large extent and it should be considered that – in the light of Uganda’s prevalent problems (i.e. HIV/AIDS infection rates, political conflicts and the degree of absolute poverty) – it will be crucial for the credibility of all activities to be well co-ordinated and complementing each other instead of creating redundancies. One important means to avoid the latter would also require to provide for a better co-ordination of the activities of the ministries, which, in some cases, seem to compete for the funding of ICT projects. In-country and interviewees’ experiences have moreover shown that:

- the implementation of cost-effective, affordable and sustainable solutions,
- the focus on demand-oriented ICT solutions,
- avoidance of ICT applications that could exacerbate income inequalities and distort private sector initiatives and local markets,
- the application of rigid methods for evaluating the social costs and benefits of ICT activities,
- the involvement of “local champions”

can by no means be taken for granted. It may, however, be those issues that will be particularly crucial to the successful implementation of ICT related activities in the future.

The priority areas that could be of interest for German development co-operation in the Republic of Uganda are regulation, rural/universal access, human capacity and education, and the provision of relevant content. Recommendations related to these areas will now be discussed and concrete proposals made by the interviewees will be indicated.

Regulation

In order to meet current and future challenges, the regulatory body needs to be strengthened both financially and in terms of human capacity. Beyond facing the end of the duopoly in 3 years time the challenges that need to be addressed are policies to govern spectrum allocation and Voice-Over Internet Protocol (VoIP) telephony. There is also a need to strengthen and define supportive implementing legislation such as commercial and intellectual property right laws.

Germany's regulator and private sector players are enjoying a very good reputation in these areas and a mid to long-term collaboration could yield substantial benefits.

Rural Access

When it comes to the issues of rural access, it is important to distinguish financial from technical support.

1) As outlined by UCC's technical manager, the Rural Communications Development Fund needs financial support in order to meet the challenges of providing access to rural areas in the North of the country and successively foster the application of value added services even in the remoter areas.

2) Beyond financing the universal access fund, support to establish a micro-finance and franchise programme along the line of the Télécentre or Grameen Village Phone model could spark private entrepreneurship, i.e. the provision of phone and other information services. Empirical studies have shown that high externalities result if public access is provided by individuals rather than through public pay phones (Bayes et al. 1998, Bertolini 2000, ZEF 2000): apart from a better maintenance of the technical equipment and a resulting greater availability as well as the creation of employment, public call offices must be regarded as hubs for information exchange. Through those hubs community members can be contacted, messages can be left and information is transmitted to the community's population. A scheme that would foster this kind of entrepreneurship could also aim at the existing retailers of mobile phone services. In the mid-run such schemes should support the expansion of the business to privately run telecentres that, were feasible, should offer IT (e.g. secretarial) and Internet related services.

3) Although no focus area of German development co-operation in Uganda, decentralization efforts should include assessment of the possibility to enhance information flows between the various administrative levels. Where feasible and necessary, this interaction should gradually involve the whole spectrum of ICT from voice over facsimile to IT applications and Internet use. Beyond making communication within the administrative hierarchy more efficient, networked databases and decision support systems could improve decision making processes on both sides, the central as well as the local governments.

Human Capacity and Awareness

Activities in the sector of formal education are particularly difficult to track and evaluate due to the overload of activities and lack of coordination. Given its involvement in vocational training and the restructuring of the financial sector, it would be worthwhile considering for German development co-operation

- to integrate wherever possible ICT awareness raising, training and application into the vocational training programmes run by the Ministry of Education and supported by GTZ;
- to support the promotion of non-cash money transfer (e.g. to the telecom or electricity provider etc.) as soon as the financial sector is ready to handle such transactions; this recommendation only holds valid, however, if the customers are – due to their lack of experience with cashless payment – reluctant to adapt time saving and risk reducing modes of money transfer.

Other activities should support the respective government bodies and associations to set standards for various IT professions. These are lacking in the country, which creates a lot of uncertainty amongst employers and certainly amongst people who would like to get trained in IT.

Furthermore, the desire was expressed to gain from brain drain: there is a need to attract and encourage Ugandan scientists and engineers who have worked with successful ICT applications and development in other countries to return to Uganda and become agents of technology transfer. Germany's experiences with DAAD, CDG and particularly CIM could contribute to such efforts.

Content Provision

A proposal raised by the MTN management was to provide locally relevant information over RIVR (Radio Interactive Voice Response)²⁸ and Web SMS subscriber services. The starting point of this idea is to use the existing mobile cellular infrastructure to set up demand led and marketable information services. In the short to the mid run commercial farmers and small entrepreneurs could use these e.g. to obtain input or output market information in various regions of the country on a call-by-call or subscriber basis and get the requested information directly on the mobile handset. According to one of MTN's own studies, this type of information is the most important for the customers, followed by news, sports and entertainment-related information.

The specific implementation of the service would require collaboration with content providers. In this respect negotiations are on their way with CGIAR's Foodnet (cf. www.cgiar.org/foodnet).

The appealing aspect of this proposal is first and foremost the fact that no additional technical infrastructure would be required plus the sheer fact that there are already 250,000 mobile phone users who are all able to receive short messages, all customers of MTN can in addition receive and send emails over their handsets via phonenumber@mtnconnect.co.ug.

2.2.5 Tanzania Country Overview

The United Republic of Tanzania is composed of Tanganyika and Zanzibar, which merged in 1964 shortly after independence. From the 1970s up to 1995, Tanzania was a one party state with an inward looking development strategy and socialist experiments for rural development, especially in the 1970s. Meanwhile, the second multi-party elections have

²⁸ As common in most developing countries' call centres, IVR could in this context be used to retrieve information from a data base system. A user dials a dedicated number, connects to the network for a short moment and in return is supplied with the information he has asked for, e.g. the current price for Arabica coffee beans on the Kampala market.

been held, which did not, however, result in a shift of power from the ruling CCM. Privatisation of parastatal enterprises has started a couple of years ago under the direction of the Parastatals Sector Reform Commission. Tanzania covers an area of 945,000 square km. The largest city and economic power hub is Dar es Salaam, although officially the government resides in Dodoma. Population in Tanzania is estimated at more than 36 million in 2001 with population growth still at 2.6 percent per year. Tanzania is one of the least urbanised countries in Africa. 75 to 80 percent of the population live in rural areas.

Table 1: Country Overview

Capital	Dodoma
Population	36,200,000
Main city	Dar es Salaam
Population	3,000,000
% of rural population	75-80
Population density	38.1 (per km ²)
Currency (US\$ exchange rate)	1000 TSH = US\$ 1.25
Major language	English, Kiswahili
GDP per capita (PPP)	531.0
Population below the poverty line	51.1%
Gini coefficient	38.2
Administrative structure	25 Regions; 123 Districts
Literacy rate	74.7% (1999)
Infant mortality rate	90 (1999)

Source: HDR, WDR

Tanzania is one of the poorest countries in the world with a per capita GDP of US\$ 193 in 12,000 (PPP US\$ 700). The economic growth rate has been around 5 percent during the last years. The main economic activity is agriculture, which still accounts for almost half of the GDP, but for 80% of the labour force and 85% of exports. Industry is underdeveloped with a share of only 17% of the GDP and 20% of the labour force. Currently there are two major development statements by the government. The first is the 1999 Tanzania Development Vision 2025. It sketches the way for Tanzania to become a middle-income country by 2025. To achieve this objective the document calls for high quality livelihood, good governance and the rule of law, and a strong and competitive economy. The second is the Poverty Reduction Strategy Paper, which comprises the national guidelines that direct government activities. Basically, all development activities are said to be guided by the principals provided in the two policy documents.

2.2.5.1 Major Developments in the ICT Sector

Tanzania has two fixed line operators but since ZANTEL is restricted to Zanzibar there is virtually a monopoly for TTCL granted until 2005. Currently TTCL operates about 160,000 to 180,000 mainlines with a total capacity of 234,000 installed telephones. The network has undergone a major renovation in the second half of the 1990s through the Telecommunications Restructuring Programme, leading to a 95% digitised network, which, however, still has quality problems since its hardware was provided by a wide range of different suppliers.

The tariff structure is still based in favour of local calls that cost only about US\$ 0.023 per minute. Peak time long distance calls can cost up to US\$ 0.33. Calls to outside Africa cost US\$ 3.2 (off peak US\$ 2.6).

There were three public phone box operators (including TTCL) supplying more than 1000 card phones in Dar es Salaam. However, the market is consolidating as one major player's phones recently got swallowed by TTCL. The trouble in the public phone market is closely related to the failure of pagers to break through in Tanzania. Paging operators started entering the market by a time when cellular phones were already quite popular and competitively priced. The last operator has stopped services by October 2001.

The success story of Tanzanian connectivity is cellular telephony. Currently there are four cellular phone networks working. These are TriTel, backed by TRI Malaysia, MIC, backed by Millicom, Vodacom, backed by Vodacom South Africa, and Zantel, backed by Etisalat (operating only in Zanzibar). A fifth operator, TTCL's subsidiary CelTel, is to start its services soon.

Table 2: ICT Sector Overview

Market structure	Fixed lines: Monopoly until Feb. 2005 (incl. all international voice traffic); Mobile: competition, Internet: competition, Data: competition*
Fixed phone operators ²⁹	1 (2)*
Mobile phone operators ³⁰	3 (4)*
Internet service providers	13**
Digitisation of the network (%)	95**
Number of fixed lines in use (per 100 inhabitants)	180,000 (0.50)**
Number of mobile phones (per 100 inhabitants)	260,000 (0.66)**
Number of public phones (per 1000 inhabitants)	1000 (0.03)**
Number of Internet/email subscribers (%) ³¹	20,000**
Number of PCs per 1000 inhabitants	2.4 (1999)
Number of public access point to the Internet ³²	> 200**
Local call charge per minute: fixed phone (US\$)	0.02*
Local call charge per minute: mobile phone (US\$) ³³	0.25*
Average dial-up cost for a month using 30 hours ³⁴	49*
Radios (penetration rate, % of households)	1.52 (1997)
TV receivers (penetration rate, % of households)	7.90% (1998)

* October 2001

** Industry estimate October 2001

Source: ITU, WDR

Growth in the cellular market picked up with the market entry of Vodacom at the end of 2000 and the introduction of prepaid services. Charge cards are available for amounts as low as US\$ 5 (valid for 30 days). More than 90% of users use the prepaid services. A prepaid card costs US\$ 20 (resellers sell it for as little as US\$ 13). Handsets are available at prices similar to European markets. Prepaid calls cost from US\$ 0.09 (night, within the same network) to US\$ 3.60 (peak international) per minute. SMS are very popular and have only been charged since recently. Mobitel offers to receive e-mails via their mobile phones. On the revenue side cellular operators probably rely on a minority of heavy users. It is estimated that about two thirds of the users spend only insignificantly more than US\$ 5 per month. However, the cellular market is assumed to have a volume of US\$ 100 mill. in 2001.

29 Incl. Zantel which is licensed only for Zanzibar.

30 Incl. Zantel which is only operating in Zanzibar.

31 User number is estimated to be five times of subscriber number.

32 Mainly Dar es Salaam (estimated go up to more than 1000).

33 Peak post-paid rate.

34 Flat rate.

The operators are constantly rolling out their network to smaller towns and try to cover the major roads. The market is highly contested. However, another shake-up of the market, most probably bringing down prices further, is to be expected by the end of the year when CelTel will enter the market with the full backing of the incumbent TTCL.

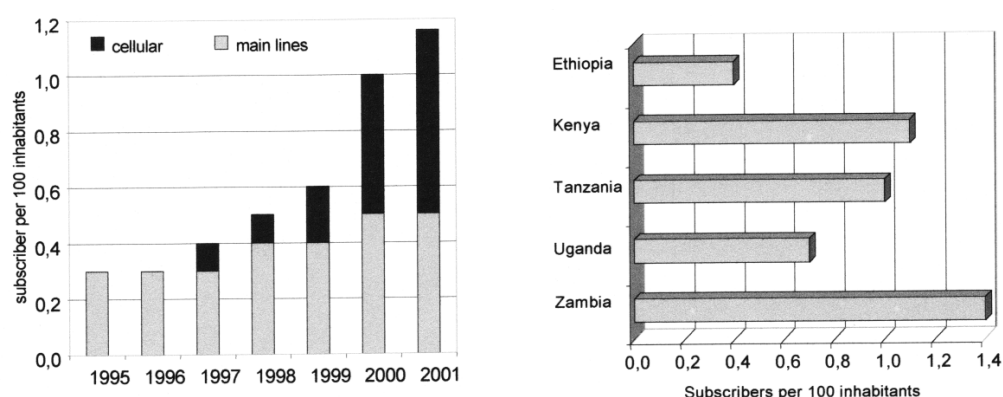
Table 3: Performance of the Telecommunications Sector

	1995	1998	2001
Installed fix lines	90,270	121,769	180,000
Mobile lines	3,500	37,940	260,000
All lines	93,770	159,709	440,000
Waiting time to install a fix line	n.a.	3.6 years	n.a.
Installation charge	n.a.	n.a.	n.a.
Average cost of a 3 minute local call	n.a.	US\$ 0.1	n.a.
Connections per 100 habitants	6,860,000	7,642,636	n.a.
Localities with telephones	n.a.	n.a.	n.a.
Public telephones	585	706	1,000
Digitisation of the network	42.8%	82.3%	95%
Optic fibre (km)	n.a.	n.a.	n.a.
Employment by the sector	4,775	4,575	n.a.

Source: ITU; WDR

Graph 1: Developments of Telecommunications in Tanzania

Growth in the absolute number of subscribers to telephone services in Tanzania. Comparison of teledensity between Tanzania and other African countries in 2000.



Source: ITU

2.2.5.2 Rural Connectivity

Tanzania is to a large extent a rural country with 75-80 percent of its population living in rural areas. The total number of villages at the sub-district level is estimated at 8000 to 9000 with an average village size of 2,500. In 1998 TTCL's reach to rural areas was estimated to be 17-20,000 lines with most of these lines probably connecting district capitals. Therefore, the maximum teledensity for rural areas was 0.08.

The licensing terms for TTCL oblige the company to cover each village with more than 3000 inhabitants with at least two public phone facilities by 2005. NTP 1997 as well provides for a universal service fund, a measure that applies, at it is understood now, for villages beyond

TTCL's obligation. There are a couple of options to encourage / force telecommunications operators to cover rural areas. MCT currently seems to favour an universal service fund that is financed by foreign donors and licence fees.

Recently, cellular phone operators have become the main drivers for rural connectivity. On the one hand they are providing connectivity to rural areas near major roads. On the other hand they try to reach out to rural areas with their network, in some cases with donor money. Vodacom operates a cell at Sengerema, a telecentre site. It also rolls out so-called Tele-shops to rural areas that are covered by its network. Simunet, the data subsidiary of TTCL, plans to roll out a national backbone to all districts by the end of 2002.

2.2.5.3 The Internet in Tanzania

Commercial Internet access was established in Tanzania in 1996. 13 Internet Service Providers (ISP) are currently licensed by TCC. For historical reasons, Tanzania distinguishes between ISPs and data service providers. Only licensed data service providers are allowed to run data networks and international links. The original data service providers are SITA Group, Wilken Afsat and DATEL Tanzania, which got licensed in 1995/96. In 2000, three more operators, including the TTCL subsidiary Simunet, were licensed.

The 13 ISPs currently have an estimated subscriber base of 20,000 to 30,000. The dominant players are Raha (www.raha.com), Cats-Net (www.cats-net.com), CyberTwiga (www.twiga.com), Africa-Online (www.africaonline.co.tz) and to some extent Simunet, which has an ISP as well as a data licence (www.simunet.co.tz). Predominant in the retail area are flat-rates. Representative for Internet cost are Cybertwiga's monthly rates of \$ 48 for a PoP account, WWW-access and 5 MB web space.

Secondary city access is developing. The large ISPs have dial-up points in one to three cities outside Dar es Salaam. For its prepaid service Cybertwiga offers access points in Dodoma and Tanga. For corporate customers in many cases microwave links are established.

However, the main mean of Internet access in Tanzania are browsing centres, i.e. Internet Cafés. For each subscriber an estimated five users can be assumed, bringing the number of Internet users in Tanzania up to more than 100,000. Browsing centres have been mushrooming in Dar es Salaam during the last two years. There are only rough estimations about the number, with 200 seeming to be a realistic estimate. The cost for using a browsing centre normally is Tsh. 1000 per hour (US\$ 1.15). Browsing centres also exist in places outside Dar es Salaam, notably in larger towns that are connected to national data lines. Prices are reported to be similar to Dar es Salaam.

Wholesale prices of leased lines are quite expensive since all international data traffic is routed through satellites. Internet cafés are in general connected to an ISP by a direct wireless link providing 64 kbps.

The development of Internet in Tanzania is still constrained by bandwidth problems. The national backbone is still not much developed. Simunet is investing heavily to connect the different regions by microwave. There is no "neutral" national Internet exchange. So far, traffic between the Tanzanian ISPs has been channelled via the USA and Europe. The Internet exchange will as well save international bandwidth. At present, Tanzania has approximately 4 Mbps uplink and about 20 Mbps downlink available.

2.2.5.4 Discussing Strengths and Weaknesses³⁵

Departing from the description and analysis of the current situation of ICT development in Tanzania, this section aims at assessing the strengths and weaknesses concerning these activities and tries to identify opportunities and major bottlenecks for the future development of ICT and ICT-related activities that will be sustainable and favourable to the overall development of Tanzania. This analysis is based on the perceptions and comments of various experts interviewed in the course of the country survey, on the analysis of literature on the topic and on the present author's subjective perception during a visit to Tanzania in October 2001. The current assessment is therefore subjective and open to criticism and discussion.

It is structured in accordance with the corresponding country report and subject to the disclaimers given in there, i.e. the assessment of some issues, such as health, is only based on brief glimpses into the sector while the assessment of other aspects, i.e. connectivity, entrepreneurship as well as the political and regulatory situation, can be considered to be based on a comprehensive insight into these subjects. Accordingly, the different sections are assigned different weight in this section.

National ICT Policies and Infrastructural Developments

The situation in the areas of e-strategies, ICT-related policies and e-government is in general quite encouraging in Tanzania. Nevertheless, there are a couple of severe downsides that endanger the ongoing processes.

Tanzania is currently under way to develop its own national ICT policy. This development has been initiated by the eThinkTank, a group mainly of industry representatives but also involving government officials and donor organisations. The work of the eThinkTank has created a cooperative sentiment among the different actors. It is said to be the first time that a loose informal interest body is involved in the process of drafting policies. The drafting of the actual policy is done by a task force inside the Ministry of Communication and Transport (MCT) that, similar to the eThinkTank, includes private sector, education, science and political representatives (there is a considerable overlap with the eThinkTank members). The draft is due to be presented by Spring 2002.

In spite of being remarkable as such, the policy formulation process faces some problems. First, there are conflicting interests in the government. It does not seem to be the best solution that the drafting process is now with the MCT. A leading role in the eThinkTank had the Civil Service Department of the Prime Minister's Office (CSD). CSD already has some experience in implementing IT in government and seems to be staffed with more dedicated personnel. Generally it is more trusted than the MCT. The chance that the development of the policy fails or that the policy is not appropriate is stronger in the current set-up. So far, the conflict of interest could be solved with both sites still cooperating. But power struggles have already slowed down the whole process during the first half of 2001.

An issue that has been overlooked in the current policy formulation process so far is the pervasive nature of the changes needed to support the development of ICT activities in the country. It is not only the MCT that is involved. Changes have to occur in many other policy areas (commercial law, banking sector etc.). Co-ordination in this respect has been minimal

³⁵ A tabular overview about strengths and weaknesses is attached to this report.

so far, which endangers a sustainable impact of the developed policies. Considering this aspect, the hub of activities would have been better positioned within the CSD since it has a co-ordinating task within the government, too.

The assessment of regulatory achievements in Tanzania is ambiguous. In comparison to other East-African countries, regulation is functioning well. The regulation agency TCC has been existing for more than 7 years. Cellular phones and Internet are booming. Privatisation of the incumbent is on its way. However, the picture changes when we look at absolute terms. Ask any representative from the telecom sector and they will tell you that regulation is problematic, if not the greatest problem for business. Regulation is often inconsistent, and for some markets, e.g. Internet, there is no clear direction. The general feeling with the industry is that the reason for this is not conscious purpose, but simply incompetence. It appears that the TCC considers itself to a large extent a licensing and fee collection agency. On the policy side it lacks the professionalism and toughness that is required to provide an environment capable of ensuring a flourishing industry while dealing with the major, internationally backed players.

TCC is certainly not prepared to take on the regulatory challenges ahead. These are for example the enforcement of the licensing requirements by TTCL as well as dealing with the issues of VoIP and convergence.

TCC lacks trust with the industry because of its set-up, too. A number of commissioners have close links to TTCL or are from MCT. This makes the independence of the commission questionable. TCC's leadership should therefore be reorganised to ensure independence. Experience from successful independent commissions in other African countries, i.e. electoral commissions, calls for the delegation of rather seasoned personalities with an academic background (and preferably a career abroad) to a post such as this.

E-government has so far been no big issue in Tanzania. There is a government web page, which, however, does not provide interactive features. The hub of IT activities within the government is the Civil Service Department in the Prime Minister's Office (CSD), which is in charge of the Public Sector Reform Programme, too. Up to now, the administration's attitude towards e-government has been rather realistic, i.e. efforts are aimed at internal efficiency rather than at outside relations. Building up a functioning information system inside the government and acquiring experience in the use of new technologies is considered the prerequisite to providing services to the general public.

Activities in the area of e-government and e-governance should be co-ordinated with CSD, because on the one hand it has some experience with such projects (and has proved to be competent) and on the other hand it is in charge of the whole process of public sector reform.

Connectivity, Access, Costs

The strengths concerning connectivity in Tanzania are found in the mobile sector. There is already a functioning competition, and a new major player will soon shake the market in terms of services and prices. Mobile connections are soaring and so is coverage of the country. On the fixed line side, ambitious targets were set for TTCL. However, prove of delivery is yet to be given. The Internet market is highly competitive too and provides public access wherever possible.

On the negative side, teledensity, fixed as well as mobile, is still very low and large parts of the country are still unserved. TTCL is required to offer connectivity to all locations with more than 3000 inhabitants by 2005. For smaller locations MCT plans for a universal access fund. However, these ideas do not seem to be very much elaborated at this stage. It is questionable whether regulation allows for innovative solutions for this problem.

A great problem are costs related to international connectivity. International telephony is very expensive since it is still a monopoly. Even mobile operators have to route their calls through TTCL. International data connectivity is as well deficient. All data traffic is routed via satellites, raising costs. There is still no international fibre connection for East Africa.

Inside Tanzania these problems are reinforced by the lack of a national Internet exchange. Simunet of TTCL offers to set this up. But the small ISPs are reluctant to become dependent on the incumbent.

Human Capacity Development / ICT Education

In general, the human resource situation in Tanzania is bad. This restricts a widespread application of ICT and makes it difficult to provide the adequate skills. However, there are some pockets of particular strengths and useful activities.

During the interviews with various experts a strong feeling became apparent that there is a general lack of awareness concerning the opportunities offered by IT. Awareness building, which is a prerequisite to formalised training on ICT issues, hardly exists in the formal education and training system. In Dar es Salaam there will be some informal awareness building through the mushrooming Internet places. However, it is felt that many people in leading positions still lack knowledge about the advantages the new technologies might offer to them. Conducting awareness building sessions is easy in the cities, where a lot of Internet cafés offer access to computers. In rural areas this is more difficult. Isolated projects such as COSTECH's Cybertruck proposal seem questionable in their effects. Awareness building activities should either go in line with the existence of facilities or should include providing permanent facilities.

ICT education in Tanzania happens at the university level, in private training and to a very small extent in schools and public training facilities (COSTECH, AVU). However, demand is outstripping supply to a large extent. Computer science and technical engineering programmes at the University of Dar es Salaam and other higher education institutions are still in their initial phases and have a small output. On the applications side, the bulk of private training offers apparently has quality problems. Courses certified by multinational IT enterprises are helpful but provide only few places. Public training facilities such as COSTECH or AVU are in competition with private players but have only small capacities. Therefore there is a general lack of skilled personnel felt in Tanzania's ICT sectors.

Any initiative set up to close this gap between supply and demand, however, should take into account that the ICT markets themselves are small and will be able to absorb only a limited number of people.

Application of ICT in education is hardly existent outside the university level. The issue of awareness has been discussed above. Projects of e-learning have not been identified.

At the University of Dar es Salaam the University Computing Centre (UCC) is apparently experimenting successfully with on-line education tools. Compared to COSTECH, where plans for e-learning exist, too, UCC is a highly competitive institution with impressive capacities. Future initiatives in the area of e-learning and on-line education should approach UCC for co-operation rather than COSTECH.

ICT Enterprise and Entrepreneurship

The ICT sectors have proven to foster entrepreneurship and private sector development in Tanzania. The vibrant markets of cellular telephony, Internet and IT services are probably major assets for a positive future development of ICT activities in the country. However, deficient institutions, red tape, corruption and bad regulation constrain private sector development.

Initiatives by the telecom operators to provide connectivity in rural or poor areas entail as well entrepreneurial components. However, to provide a wide coverage and sustainable business it might be necessary to offer entrepreneurship and management training to potential franchisees of phone shops.

Participation in Addressing New International Policy and Technical Issues Raised by the Internet and ICT

With participation in the G8 Dot Force, Tanzania is well represented and heard on the international stage. Wider representation in more international bodies would block scarce human and financial resources in the country.

Since Kiswahili is written in the Latin script, there are no problems of adapting computers to the language.

Dedicated Initiatives for the ICT Inclusion of Least Developed Countries

There are a couple of local initiatives that provide support for ICT connectivity or the use of ICT applications, e.g. "Tanzania Computer Literacy for Secondary Schools". However, it seems that compared to other developing countries, such as India, these initiatives are rather limited, not well marketed and not co-ordinated.

ICT for Health Care and in Support Against HIV/AIDS and Other Infectious and Communicable Diseases

It is difficult to get an overview of current ICT-related activities in the health sector. Positive is the existence of an institution such as Muhimbili University College of Medical Research (MUCHS), which has a long-standing experience with information technologies. Since the sector is information intensive there is certainly additional scope for information sharing systems such as HealthNet or the distance learning environment proposed by GTZ. Newly established systems and the extension of already existing systems should take into account any progress in infrastructure development.

Local Content and Applications

The main constraint concerning local applications and content is the small size of the Tanzanian market. There is only a very limited user base for specially adapted software products as well as for local Internet content. Advanced mobile communication features such as WAP face the same problem. However, the market is growing fast, and in line with this development Tanzanian content in the Internet is mushrooming. Most of the important information about the country, government, politics, tourism, news etc. are easily available on-line. Partly, this development is enhanced by a growing cooperation of ISPs and local content providers on the one hand and by the important tourism industry, which is always a front runner in Internet applications, on the other hand. The commercial viability of these effort is, however, undermined by the small user base.

The description above is to a large extent derived from the development in Dar es Salaam. Wide geographical areas and parts of the population are not represented in the Internet nor can they get access to appropriate local information (preferably in their local language). One can expect a swift development in this direction as soon as connectivity becomes available but at present there are still huge deficiencies and imbalances.

ICT in Development Assistance Policies and Programmes, Participation in Multilateral ICT Initiatives

Tanzania is one of the countries which are experiencing a wide range of support in the area of ICT. There are many international donors on the ground that are explicitly engaged in ICT-related activities. In a general sense, though, this fact is ridiculed by the kind of projects conducted. Many donors (ITU, UNESCO; IDRC etc.) are involved in developing telecentres, an approach which is problematic because it does not account for private entrepreneurial initiative.

The eagerness of donors is anticipated by local organisations. COSTECH is continuously proposing fancy projects, such as a “cybertruck”. Even private ISPs dig for foreign money, e.g. to set up a local Internet exchange (at the cost of only a couple of US\$ 10,000).

Up to now, there has been only little co-ordination between the different donors, which results in a doubling of activities in some fields and neglect of others. The co-ordination problem is addressed by the ICT policy makers. eThinkTank and MCT want to use the new national e-policy to set priorities.

2.2.5.5 Potential Areas of German Contribution

General Issues

Based on the information gathered from secondary sources as well as in Tanzania and based on the strengths and weaknesses analysis, this section is supposed to provide some advice for future German activities to promote ICT and ICT use in Tanzania.

There are political constraints. German development co-operation in Tanzania is supposed to concentrate on three areas: sustainable natural resource management, health and water supply. All German activities should be geared to these topics.

Notwithstanding these constraints this section will briefly assess and propose possible contributions from the German side that can be considered helpful for ICT development. The structure of this section is the same as in the corresponding country report and the strengths and weaknesses analysis (cf. 1.3). Therefore some areas are covered rather briefly.

National ICT Policies and e-Government

The development of a national e-strategy is underway with local input coming from the ICT sectors. Foreign involvement has so far been minimal (UNDP is co-ordinating the process to some extent). No further support is needed at this stage.

The regulation agency needs some reform and a significantly increased capacity to tackle the important regulatory decisions in the near future. Helping TCC to become competent and tough can be considered a major contribution to let ICT markets flourish in Tanzania.

Concrete proposal: send German regulation experts to support TCC. This might be done for a long or medium term assignment via SES. Personal support can be considered more effective than more study tours by TCC staff (the ICT industry already complains about high absentee rates.)

Note: a problem with German support might be credibility since a German investor (DETECON) is tied up with the incumbent.

e-Government

First e-government activities within the Tanzanian government are underway, co-ordinated by the Civil Service Department of the Prime Minister's Office (CSD). Because of the experience and relative efficiency of CSD, all projects in this direction should be co-ordinated with this department.

Concrete proposal: GTZ is supporting the Tanzanian Revenue Authority (TRA). There are already some ideas for a network of local offices of TRA. These should be co-ordinated with other activities and developed further.

Connectivity, Access, Costs

The whole infrastructure area lies in the realm of financial co-operation. Considering the vibrant private initiative-driven ICT markets, it is not necessary to get involved into technical co-operation projects. Especially support for telecentre projects, e.g. Sengerema, should be avoided!

Concrete proposal: in the area of connectivity there is some German financial co-operation involvement with KfW financing a fibre optic backbone along the railways (covering about 450 km). It has to be checked with the business model of TRC whether an expansion of this infrastructure is adequate or whether other means exist to achieve the objective, i.e. reliable communication links for TRC.

Additional financial involvement from the German side should only go to areas that are not covered by licences, e.g. it is the responsibility of TTCL to provide connectivity to locations with more than 3000 inhabitants! Support for a universal access fund which is to cover

connectivity beyond licence requirements can be considered. The same holds for initiatives to increase international bandwidth (through fibre optic cable).

DEG is already engaged directly (though long-term financing in mobile operator Vodacom Tanzania) and indirectly (through its holding in MSI) in the Tanzanian market. It should be encouraged to continue investing in companies and projects when there is need to finance network rollout to underserved areas.

Human Capacity Development / ICT Education

In these complex and multi-dimensional fields, co-operation and support can be rendered in many ways.

- Initiatives for IT-awareness building for politicians, public servants, teachers etc. in Tanzania (a cost efficient way is to use existing infrastructure such as Internet cafés).
- IT-training for businesspeople (CDG is currently setting up a programme)
- New technologies enable developing country scientists to get closer to their colleagues in the North. Germany can encourage university co-operations, partnerships and knowledge sharing programmes. Virtual exchanges with German institutions could be set up (DAAD, BMBF)

ICT Enterprise and Entrepreneurship

Public development assistance involvement should be minimal in the private sector. There is nevertheless a need to support potential young entrepreneurs who pioneer in formerly underserved areas.

Concrete proposal: set up business training schemes for future or existing phone shop and Internet café franchisees and owners. This project could be combined with a small loans project to provide seed capital for these businesses. Organisation: GTZ, CDG

Dedicated Initiatives for the ICT Inclusion of Least Developed Countries

No proposals for direct German activities. However, small initiatives can receive funding from infoDev, the World Bank's ICT-loan and grant programme. Germany should consider raising its contribution to infoDev's funds.

ICT for health care and in support against HIV/AIDS and Other Infectious and Communicable Diseases

In the health sector GTZ is active to provide IT equipment for hospitals and training on the appropriate use of IT equipment.

Concrete proposal: GTZ has plans to promote an IT-based information system with MUCHS as a hub. These activities seem to be highly adequate and should be pursued.

Local Content and Applications

Many development projects generate specific local content and relevant information. All German projects should become active in disseminating this content and information beyond the project. Projects should have specific knowledge sharing requirements. ICT can help to enhance this process (data bases, project web pages). Through this means Tanzanian development-related content can increase rapidly.

ICT in Development Assistance Policies and Programmes, Participation in Multilateral ICT Initiatives

All current and future German activities in the area of ICT should be co-ordinated with other donors in order to avoid doubling of activities.

So far rudimentary co-ordination (DAC sub-committee) has been carried out by Riku Asakainen of UNDP.

2.3 A Brief Synopsis

The overall objective of this study was to provide a starting point for the involvement of development assistance in the promotion of ICTs for development. In the form of country studies we first tried to give insights into the ICT sectors along with stakeholders' and other ICT-related activities in the selected countries (Peru, Vietnam, Lao P.D.R, Uganda and Tanzania). Based on this assessment, strengths and weaknesses were named and starting points for potential German involvement identified. The following section should point at some general lessons learnt from all countries and, with due caution, sum up the activities and discussions on the German donors' side, as they emerged in the countries themselves or in discussions while this study was conducted.

Lessons Learnt

Although the selection of the five countries was not guided by a systematic process but rather based on decisions made at round table expert meetings, the findings of the study uncovered that ICTs play a significant role in the political discourse of all countries. It is obvious that politicians have recognised that well managed telecommunication entities can create benefits for the state as well as for the vast majority of the population.

Telecommunication Sector Reform

As obvious from the country studies, all countries had carried out a telecommunication sector reform that lead to significant improvements in access to telecommunication facilities. The success of the reforms and their depth differ and do not necessarily relate to the countries' state of development but rather to the quality of governance and institutional conditions.

Technology

The various technological solutions applied in the countries already reflect their differences in population density, physical environment, customers' financial potential of the customers and so on. From the users' point of view, the variety of technologies applied for the purpose – and this might be a first lesson learnt – does make it obsolete to differentiate between WLL, mobile, fixed mobile and VoIP. Seen with regard to returns on investment and also the capability of the technologies to carry Internet services, the picture differs to some extent.

ICT and Education

With respect to ICT-related education, it became apparent that public institutions most of the time lack the financial, human and infrastructural resources to provide sound training to their students. This must change if people belonging to other than the urban upper class, which is able to afford the courses offered by the private sector, should participate in the “ICT revolution”.

In terms of the application of ICTs for distance education and training, the experiences gained need to be exchanged and openly discussed: so far, neither the African Virtual University nor other institutions visited during the study have been able to convince experts of all levels and background of their efficiency, sustainability and content-related adequacy. Given the short term of existence of such efforts, more research on their impacts and the actual needs of students seem to be crucial in this area.

Rural Inclusion

Another aspect common to all countries is the danger of rural and remote areas to loose out in the process of telecom restructuring and expansion: while the Ugandan case shows that technical leapfrogging can offer the potential for fast integration of those areas into the telecommunication networks, the proper marketing of the services to the general public lacks institutional and financial support. Against the background of the successful franchising schemes for offering public call offices e.g. in Senegal and Bangladesh and the importance of informal resale of services, it seems legitimate to wonder why such success stories do not spread more widely in developing countries.

Behind this background and in light of the positive impacts voice telephony has to the vast majority of the population, development assistance should promote the idea of universal access to the poor wherever possible. This does not necessarily apply for the spread of Internet access.

Internet Diffusion

Concerning the spread of Internet utilisation, quick developments could be achieved in all countries' capital cities and particularly those places where many foreigners can be expected. Many donor and civil society driven projects aim at improving access to the Internet for poor and rural areas. Most of them got stuck in the pilot stage because they do not seem to centre on the real or hidden information needs of the people. In some cases it became obvious that they are rather driven by the motivation to sell equipment and open up markets. Whereas this is certainly not a bad thing in itself, it needs to be accompanied by a commitment to sustainability that goes beyond project proposals. Furthermore counterproductive seems to be the excitement of actors and decision makers from donor countries, who sometimes seem to

forget about the actual impacts of those technologies and their cross-sectional character. Moreover, one could imagine ICTs being yet another means for the development assistance community to keep on reinventing itself by pushing new ideas and concepts.

Private Sector Involvement

The application of Internet services should rather be promoted through the private and the public sector only where demand will be significant and where the transmission of information is assured: either by a relatively high proportion of computer literates in the population or by intermediaries who provide the starting point for information services to spread. Moreover, the idea of telephony based information systems such as SMS subscription services could be an intermediate step towards the spread of more sophisticated applications. This is only one example where the private sector proved to be extremely interested to proactively develop ICT markets if the political frameworks allows to do so.

However, the studies also showed that the private sector will not necessarily be able and willing to provide universal access, which makes access to basic telephony a political issue in all countries. As obvious from the study countries, the latter goal can be achieved in different ways and qualities and depends on the government's and civil society's role.

Government and Civil Society

In order to define this role, looking at the present study may help to judge on such foci that centre on the countries' societies' rather than the donor agencies' needs. The Governments' key role should be supported by development co-operation in providing conducive institutional and regulatory frameworks and fostering efficient ICT use in public goods provision, i.e. in education, health and administration.

The NGOs' role certainly depends on the particular non-governmental environment in the individual countries but can range from articulating the needs of those who are in danger of further marginalisation by both technological developments and institutional change to assessing the real information needs of the population and provide locally relevant information.

German Contributions

It was another goal of the study to foster information exchange about ICT developments between actors of German development assistance in Germany and the pilot countries. This was done by setting up an email discussion and by consulting the most important institutions during the desk and in-country study as well as after first results were submitted. Generally speaking, the feedback from the countries was positive and important insights could be achieved through the consultation process.

Fora for Partnership and Networking

A triangle of key strategic partners from the public, the private and the non-profit sector for potential collaboration and for setting up round table discussions with these partners in order to develop an action plan for German support would require further initiative and sound preparation. However, the extensive coverage of the three sectors (see list of interviewees in the Annex) will help to organise such initiatives in the future and link them to global initiatives and networks such as the Global Knowledge Partnership (GKP), the Global

Development Gateway and Network (GDG, GDN), the Association of Progressive Association and Oneworld.

Strategy

In case German development assistance is willing to get involved and promote the spread of ICTs for development in a more straightforward way, it will be crucial to come up with a joint effort and strategy. Such a strategy could be directed towards the mainstreaming of ICT components in existing projects and information exchange and management for the design and implementation of projects. It would also be possible to create a specific portfolio of activities that aim at ICT promotion in specific countries and with specific content-related foci.

Building upon Existing Projects and Initiatives

Examples of approaches being applied were discussed in the context of the individual countries, e.g. the importance of ICTs in the restructuring of the financial sector or the external benefits and hidden demand of the rural population as they became obvious through the KfW-sponsored expansion of the rural telecommunication infrastructure in Lao P.D.R.

In more general terms, it was found that the private sector is not only able to provide technical infrastructure but also fosters content provision through innovative ideas.

Civil society organisations should focus on their core competence rather than provide services and access: they should take on the grassroots' position and powerfully point at shortcomings and potentials for improvements in the ICT field, raise awareness in the population and constructively oppose trends towards polarisation, exclusion and a further widening of the digital divide on the national and the local level.

Need for Further Information

It will require in-depth studies if decisions are made to initiate particular projects and programmes. Such studies should also consider governance issues in order to point at deficiencies in the regulatory and institutional set-up of developing countries' ICT sectors and beyond. Such set-ups are often characterised by a too simplistic adaptation of strategies that were originally developed in and for the industrialised world. There seems also to be a need to call for a more adjusted and differentiated view of the potentials connected with the implementation of ICTs in low-income countries and the risk of excluding vast majorities from these potentials.

Focus on Development Needs

Meeting those needs should not only enable a more fruitful discussion with critics who perceive the issue – in light of the often overwhelming problems of hunger, water scarcity, and physical threat – as a diversion from basic development needs. It should, moreover, foster sustainable and on-the-ground developments and applications that consider the importance of basic telecommunication infrastructures. These tools, which in comparison to the Internet seem less fascinating to many, still remain the missing link for the vast majority of people in low-income countries. Access to these tools are the basis for increased participation, empowerment and influence of the poor in their own societies and the promotion of market developments.

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5 Abbreviations

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
AusAID	Australian Government's Overseas Aid Program
AVU	African Virtual University (an IBRD project)
BMZ	German Federal Ministry of Economic Development and Co-operation
BOT	Built-Operate-Transfer
BTA	Bilateral Trade Agreement
CCM	Chama Cha Mapinduzi (CCM-Revolutionary Party of Tanzania)
CDG	Carl-Duisberg-Gesellschaft, Germany
CEPES	Centro de Estudios Peruanos
CGIAR	Consultative Group on International Agricultural Research
CIM	Centrum für Internationale Migration und Entwicklung, Germany
CPI	Centro Proveedor de Informacion
CPT	Compania Peruana de Teléfonos
CSD	Civil Service Department
DAAD	Deutscher Akademischer Austauschdienst, Germany
DAC	Development Assistance Committee
DGPT	Department General of Posts and Telecommunication
DOT Force	Digital Opportunity Taskforce
EDIST	Long Distance Education Project
ENTEL	Empresa Nacional de Telecomunicaciones
EPTL	Entreprise d'Etat des Postes et Télécommunications Lao
ETL	Entreprise des Télécommunications Lao
FDI	Foreign Direct Investment
FITEL	Fund for Investment in Telecommunications
FONCODES	National Fund of Compensation and Social Development
GDP	Gross Domestic Product
GNP	Gross National Product
GOU	Government of Uganda
GPRS	General Packed Radio Service
GSM	Global Standard for Mobile Communication
GTN	Global Technology Network
GTZ	Gesellschaft für Technische Zusammenarbeit, Germany
HCMC	Ho Chi Minh City
IANA	Internet Assigned Numbers Authority
IAP	Internet Access Provider
IBRD	International Bank for Reconstruction and Finance (World Bank)
ICANN	Internet Corporation for Assigned Names and Numbers
ICT (IT)	Information and Communication Technologies
IDRC	International Development Research Centre
IFC	International Finance Corporation (of the World Bank)
ILD	International Long Distance
IPCE	Peruvian Institute of Electronic Commerce
ISDN	Integrated Service Digital Network
ISOC	Internet Society
ISP	Internet Service Provider
IT	Information Technology
ITDG	Intermediate Technology Development Group
ITU	International Telecommunications Union
IVR	Interactive Voice Response
JICA	Japan International Co-operation Agency
JTEC	Japan Telecommunications Engineering and Consulting Service
IXP	Internet Exchange Point
KfW	Kreditanstalt für Wiederaufbau, Germany
LAN	Local Area Network
LANIC	Lao National Internet Committee
LDC	Less Developed Country
LSTC	Lao Shinawatra Telecom Company, Ltd.
LTC	Lao Telecommunications Company
MCT	Ministry of Communication and Transport
MCT	Multipurpose Community Telecentre

MCTPC	Ministry of Communication, Transportation, Post and Construction
MIC	Mobitel International Communications Tanzania
MOES	Ministry of Education and Sports
MOWHC	Ministry of Works, Housing and Communications
MTN	Mobile Telephone Networks
MUCHS	Muhimbili University College of Medical Research
NEM	New Economic Mechanism
NGO	Non-Governmental Organisation
NLD	National Long Distance
NORAD	Norwegian Development Agency
NPI	Lao National Polytechnic Institute
NTP	National Telecommunications Policy
OSIPTTEL	Supervisory Agency for Private Investment in Telecommunications
PEAP	Poverty Eradication Action Plan (of the Vietnam Government)
PMP	Point-to-Multi-Point
POP	Internet Point of Presence
PPP	Private and Public Partnership
PPP	Purchasing Power Parity
Prompex	Commission for Promotion of Exports
PTC	Primary (School) Teacher (Training) College
RCDF	Rural Communications Development Fund
RCP	Red Cientifica Peruana
RIVR	Radio Interactive Voice Response
Rurtel	Rural Telecommunications
SME	Small and Medium-sized Enterprise
SMS	Short Message Service
SNO	Second National Operator
SOE	State-Owned Enterprise
STEA	Science, Technology and Environment Agency
TCC	Tanzania Communications Commission
TdP	Telefónica del Perú
TRA	Tanzanian Revenue Authority
TRC	Tanzania Railways Corporation
TRI	Technology Resources Industries
TSh	Tanzania Shilling
TTCL	Tanzanian Telecom Co. Ltd.
TVH	Thailand-Vietnam-Hong Kong
UBOS	Uganda Bureau of Statistics
UCC	Uganda Communications Commission
UCC	University Computing Centre
UCI	Ugandan Communications Institute
UIA	Uganda Investment Authority
UMA	Uganda Manufacturers Association
UMTS	Universal Mobile Telecommunications System
UNCST	Uganda National Council for Science and Technology
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEVOC	UNESCO's International Center for Technical and Vocational Education and Training
UNICEF	United Nations Children's Fund
UOL	Uganda On-Line
UPE	Universal Primary Education
UPL	Uganda Posts Ltd.
UPTC	Uganda Posts and Telecommunication Corporation
USAID	United States Agency for International Development
USO	Universal Service Obligation
USh	Uganda Shillings (US\$ 1.00 = Ush 1,6800)
UTL	Uganda Telecom Ltd.
VDC	Vietnam Data Communications
VETS	Vocational Education Training System
VND	Vietnam Dong
VNNIC	Vietnam Internet Network Information Center
VNPT	Vietnam Post and Telecommunications
VoIP	Voice over Internet Protocol
VSAT	Very Small Aperture Terminal
WLL	Wireless Local Loop

6.1 Annex: Peru – Activities around ICTs

Overview about ongoing activities in the field of ICTs and summary of potential contributions

(Source: AIDA Database and in-country assessment)

	Ongoing Activities	Donors	Potential Contributions	
Main Areas	E-strategy/policy	Peru has already developed a Global IT strategy but it is not yet officially formalized and implemented by the current government.	All funding from government funds.	German contribution could help in improving the national strategy and in its implementation by requesting it to be implemented as a pre-condition to the government for any international co-operation.
	Infrastructure	Rural Connectivity- FITEL is in the correct track but it needs additional support given the extremely low penetration of IT technologies in rural areas.	Telecommunication Investment Fund (FITEL)	German contribution can consist in the development of private and public partnerships with FITEL and the companies currently operating in rural areas in developing telecentres in all the district capitals of the country with strong incidence on portals with regional contents. In this sense there is a direct link with the pilot projects mentioned under contributions at the local level in terms of their replicability potential.
	Human capacity building / education	USE-10 - Huaral Valley	Centro Peruano de Estudios Sociales (CEPES)	The Huascarán plan consists of three ongoing projects started by the previous government. After analysing each of these projects we believe that the German government should only concentrate its support on the long distance education project (EDIST) through the Ministry of Education. The EDIST project concentrates on long distance education for secondary schools in rural areas, addressing the issue that most secondary schools are in the main cities.
		Quipunet Plan Huascarán	UN-IDNR Ministry of Education, Ministry of Transport and Communications and Presidency of Peru	
		Virtual Farm AID	International Potato Centre (CIP)	
	ICT enterprises / entrepreneurs hip	1. The Tool Box for SMEs (Caja de Herramientas de Gestion para la PYME) 2. INFOSIEM is another box of tools developed by the Ministry of Industry holds information of suppliers, financial institutions, suppliers of technical assistance and other institutions that support SMEs	1. Ministry of Industry with the co-operation of GTZ 2. Funded by the government	1. Currently neither of these portals is interactive; they basically consist of several links and documents with information. German contributions could help to improve these efforts so that the web portals can become interactive and also include direct links to the different institutions SMEs could need to get information. 2. We prefer German contribution to concentrate on improving the Tool Box.
Local content and applications	1. Information Systems for Rural Development (Cajamarca) 2. Agrarian Information System 3. Agrarian Portal - Information 4. Agrarian Information System via Internet for the Junta of Users of Valle del Rio Chancay-Huaral (Huaral province with 18 localities). 5. Network of Information and Communication for Rural Development (Province of Huancavelica and Tayacaja) 6. Ashaninka Portal 7. Project Catahuasi-Arequipa	1. Intermediate Technology Development Group (ITDG) 2. Ministry of Agriculture 3. Ministry of Agriculture 4. Centro Peruano de Estudios Sociales (CEPES) 5. INICTEL (Instituto Nacional de Investigacion y Capacitacion en Telecomunicaciones) 6. Funded by IDRC - Canada and developed with support of RCP. 7. AEDES (Asociacion Especializada para el Desarrollo Sostenible)-RCP	1. No German contribution recommended. Already supported by FITEL. 2. German contribution recommended. 3. German contribution not recommended. 4. The project is too ambitious at its current stage. We only recommend German contribution in partnership with FITEL which is also evaluating the feasibility of this project and in one of the pilots to see its potential for replicability. 5. German contribution not recommended or subject to the results of the evaluation being done by FITEL. 6. German contribution not recommended 7. Currently there is some support by GTZ; we recommend to evaluate the project before increasing contribution.	
Other Areas	e-government	Updated governmental institutions with institutional web sites and a single information portal to citizens	Government own funds and possibly contribution of multilateral agencies. UNDP support on the Ministry of Justice.	German Government contribution could be to advise and financially support this information portal so that it maintains its continuity over time. This contribution must include the institutionalisation of this information portal to assure its maintenance over time.
	Health	EHAS- Alto Amazonas: System of Communication of rural health establishments	ISF (Ingenieria sin Fronteras) and UPM (Universidad Politecnica de Madrid)	This project is currently working and we do not recommend German contribution in it. It has support from FITEL. German contribution recommended in partnership with FITEL.
	Decentralization	Public Portal in Local Governments	FITEL and Pontificia Universidad Catolica del Peru	It is currently under evaluation by FITEL but we believe it will be a significant contribution to the decentralization process which is being strongly supported by the government and different political parties in the country.
	Poverty Management	National Fund of Compensation and Social Development (FON-CODES)	Government own funds	German contribution could go to using IT in support on the existing poverty reduction programme. For example, a database that organises and monitors the progress of a number of poverty alleviation projects implemented by a development organisation, as FONCODES

6.2 Annex: Vietnam – Activities around ICTs

Overview about ongoing activities in the field of ICTs and summary of potential contributions

(Source: AIDA Database and in-country assessment)

	Ongoing Activities	Donors	Potential Contributions
E-strategy/policy	Transferring knowledge to senior officials concerned with the expansion of telecommunications service to rural areas.	Belgium's AGCD (Administration générale de la coopération au développement) (closed)	- Support for the regulatory agency and relevant ministries to lift its rather restrictive ICT policies and promote competition and price finding processes in light of the subsequent commitment to WTO and ASEAN integration; i.e.: development of a comprehensive and coherent set of national information and communication service laws, similar to the German IuKDG
	ASEAN-Australia Telecom Co-operation, aiming at assisting national telecommunication organisations to improve human resources, service quality, to achieve regional co-operation and promote regional standardisation / harmonisation of networks through Australian based training	AUSAID (closed)	- Support required for DGPT in areas of costing and pricing and interconnection agreements, frequency allocation and quality management. - Establishment of ISOC; the international NGO could certainly be a catalyst to express critique and desires related to ICT developments
	Master Plan Study on the Development of National Telecommunications Network	JICA (first phase closed)	
	Canada-Vietnam Information Technology Project aiming at the improvement of the institutional framework for policy development and implementation of information technology in Vietnam.	CIDA	
	Impact of Policy Environment Factors on the Electronic Commerce Development in Vietnam	IDRC	
Infrastructure	Rural telecommunications	AFD - Agence française de développement	- Assistance in developing a franchising and micro-credit scheme in order to help small entrepreneurs to run public call offices and eventually run privately-run telecentres
	Telephone switching systems and regional hubs	AFD - Agence française de développement	- Support the establishment of a Computer Emergency Response Team (CERT)
	Fibre Optic Links between Hanoi and HCMC	Direzione Generale per la Cooperazione allo Sviluppo/Mediocredito Centrale (closed)	
	Pan Asia Networking (PAN), i.e. creation of a technical carrier infrastructure	IDRC	
	IT Networks	Various Organisations of French Dev. Ass	
	Upgrade of telecommunication network in the central and the coastal regions	JIBC's Overseas Economic Co-operation Fund	
	Rural Telecommunication Infrastructure in the Highland, Dac Lac, Gia Lai and Kon Tum areas	SIDA	
Human capacity building/education	training for the professional competence of senior officials concerned with the expansion of telecommunications service to rural areas	AGCD (closed)	- Financial and technical support for execution of the proposed EduNet program that aims at connecting public institutions of the education sector - Co-operation between Asian Institute of Technology, Bangkok with FernUniversität Hagen to develop distance learning courses
	Post & Telecommunication Training Centre	JICA	- Assistance in introducing a Computer Driving Licence as it is currently planned within the EU
	Proposal for setting up ICT services, data communication network, supportive service organisation and end user training for the sector of science, technology and education in Viet Nam	SIDA	- Assistance in developing standards and common certificates for ICT related professions - Co-operation with Vietnam Corporation for Electronics Industries (VCEI) for the establishment of a vocational training centre for workers in the production of consumer electronics, IT hardware and medical care technology in Hai Phong.
	Methods and techniques for the development and Internet-based provision of teaching and training materials in technical and vocational education and training	DSE	

Annex: Vietnam – Activities around ICTs (continued)

	Ongoing activities	Donors	Potential Contributions	
M e k o n g A r e a s	Human capacity building / education (continued)	Vietnam Information Technology Training JICA		
	ICT enterprises / entrepreneurship	National telecommunication network development plan Customs Computerisation SMENet: online service for SMEs	UNDP (Plan set up by Germany's DETECON) UNDP GTZ	- Support in establishing a Vietnam Software Association in order to promote the country as a producer of software and an alternative to India and other countries in offshore development of databases, applications etc. - Support for the existing system of local business development consultants in the country with better means for information gathering and decision making, i.e. market, technical info and business development related info
	Local content and applications	Creation of a content based Intranet in Vietnam. Networking government bodies as NACESTID) and the Centre for Science and Technology Information CESTI; strengthening partners' capacity in information management and service, and Intranet and Internet publishing for R&D information and publication CD-ROM of Viet Nam's laws and regulations distributed to provincial offices / Online access to laws	IDRC UNDP / DANIDA	- Research on current information needs and communication practices in rural communities in order to judge whether publicly provided Internet posts (in Vietnam called cultural centres) are feasible in financial terms and in terms of their benefits for the population
	Health	ICT training course for staff of reproductive and family health organisations	EC/UNFPA sponsor CARE and DSW	
O t h e r A r e a s	Participation in international policy making	Provision of fellowship for Vietnamese officials to attend international and regional workshop on telecommunication	ITU (closed)	
	Others (not within the centre of the DotForce Action List)	interactive web-based system for sharing information and knowledge about participatory resource management in the Lower Mekong Basin	GTZ	
		Study for potential USAID contribution related to ICTs in the private and the education sector	USAID	

6.3 Annex: Lao P.D.R. – Activities around ICTs

Overview about ongoing activities in the field of ICTs and summary of potential contributions

(Source: AIDA Database and in-country assessment)

	Ongoing Activities	Donors (state)	Possible Contributions
Main Areas	E-strategy/policy		
	Telecommunications Law: Preparing the draft of a new telecommunications law	KfW (closed: 2000)	- Raise the awareness of the importance of ICT development among top-level leaders - Continue supporting the regulatory agencies to ensure the development of non-physical / legal and institutional aspects of ICTs
	Support of telecom regulatory agency	KfW (ongoing)	- Co-operate with donors for co-ordinated deployment of ICTs
	Master Plan Study for the Future Development of Telecom Network in Laos	Japan (ongoing)	
	e-ASEAN initiatives	ASEAN	
	IT Coordination System	UNDP (proposed)	
	(e-Government) Euro-TAL ASEAN Support Project	EU (2000-01)	
	(e-Government) Management Information System at the Ministry of Education	ADB, Francophonie project	
	(e-Government) Personal Management Information System (under Governance and Public Administration Reform: GPAR)	UNDP (by domestic fund / donor support required)	
	(e-Government) Aid Coordination and Management System (ACMS)	ADB (second phase-ongoing)	
(e-Government) The Computerisation of the Tax and Customs Department (under Tax and Customs Administration Reform)	UNDP & IMF (second phase-ongoing)		
Infrastructure	Rural Telecommunications	KfW (1992 - ongoing)	- Continue supporting the rural telecom project
	CSC Optic Fibre	German consortium ¹	- Assess the different technical options of telecom network development for rural areas
	ADB Backbone Telecommunications Network	ADB (ongoing) ²	- Support regional network development initiative(s) based on critical assessment
	Telecentre pilot project	IDRC (planning)	
	Rehabilitation and expansion of the radio/TV broadcasting networks	Japan (proposed)	
Human capacity building / education	CICC IT training Centre	Japan CICC (ongoing)	- Expand the current GTZ programmes on technical and vocational education to integrate ICT components
	Co-organised IT training course	Singapore Int'l Foundation (ongoing)	- Assist ICT curricula development both in formal and informal education / training
	Internet Learning Centre	Jhai Foundation (ongoing)	- Support the training of trainers
	Independent Learning Centre under LEFAP	AUSAID (ongoing)	
	Lao-Japan Technical Training Centre	JICA (completed)	
	Lao-Japan Human Co-operation Resource Centre	JICA (completed)	
	Remote Education Network Centre	JICA (Planned)	
ICT enterprises / entrepreneurship	UNDP-APDIP Cisco Networking Academy Programme	UNDP-APDIP (proposed)	
	HKW-LNCCI Partnership Project (www.designcenter-vte.com)	Handwerkskammer Koblenz (ongoing)	- Support the development of a training programme for entrepreneurs - Support private sector partnerships between Lao and German entrepreneurs
Local content and applications	Website to link local business and foreign partners	UNDP (proposed)	
	Legal / Law Information System (under GPAR)	UNDP (completed in 2001)	- Support the efforts to create local standards
	Sustainable Management of Resources in the Lower Mekong Basin Project (SMRP)	GTZ (ongoing)	- Encourage German development partners to define and develop local contents based on their experiences - Support studies to define information needs among the local population
	Standardisation of Lao Character Set	UNDP (proposed)	- Support the development of appropriate forms of information dissemination
Participation in international policy making / Others (not within the centre of the DotForce Action List)	The Lao National Development Website	UNDP (proposed)	
	e-ASEAN initiatives	ASEAN	
	Impact Assessment Study of the Rural Telecom Project in Lao PDR	KfW / ZEF (2000-01)	

1 BB, DeTeLine and DETECON. The project was financed by a commercial loan by KfW.

2 A feasibility study was done for the Lao section of the project, and ADB is considering the financial means. The Cambodian part of the project is financed by KfW.

6.4 Annex: Uganda – Activities around ICTs

Overview about ongoing activities in the field of ICTs and summary of potential contributions

(Source: AIDA Database and in-country assessment)

	Ongoing Activities	Donors	Potential Contributions
E-strategy/policy	Rehabilitation Programme for the telecommunication sector	International Development Association (IDA)	- Strengthen regulatory body both financially and in terms of human capacity in areas such as spectrum allocation, VoIP telephony and commercial and intellectual property right laws
	Support for the restructuring of the incumbent UTL	SIDA	
	Support ICT policies and infrastructural developments for East Africa (EACSA)	IDBR (International Bank for Reconstruction and Development, Sector Investment and Maintenance Loan)	
	Support to ICT Policy Reform and setting up of UCC (Uganda Communications Commission)	IDRC	
	ICTs for government and administration of Uganda: support for government-internal use of LANs, WWW and Email	USAID / Leland	
Infrastructure	Upgrade of the TC System I	IDA/OECD	- Support the Rural Communications Development Fund in order to meet the challenges of getting access to rural areas in the North of the country and successively foster the application of value added services even in remoter areas.
	Upgrade of the TC System II	AFDB/OECD	
	Satellite Gateway	N.N.	
	Support for mobile operator Celtel	Commonwealth Development Corporation	- Support for the establishment of a micro-finance and franchise programme along the line of the Téléc centre or Grameen Village Phone model could spark private entrepreneurship, i.e. the provision of phone and other information services.
	Multi-Purpose Community Telecentre Project including: - setting up infrastructure, - awareness raising (support of community empowerment) - information exchange between rural communities - evaluation of the MCT	ACACIA (IDRC supported by UNDP, UNESCO, ITU)	- Support the decentralisation efforts; assessment of the possibility to enhance information flows between various administrative levels
	Consensus building workshops aiming at encouraging rural communities and institutions to take a more active role in generating support for rural community application of ICTs.	IDRC	
	Support of RCDF	IDRC / World Bank's InfoDev (planned)	
	Connectivity & Commerce: Accelerating the diffusion of the Internet in Uganda	IDRC	
	SchoolNet aims at providing the pilot schools and teacher colleges in rural areas with the ability to access the educational resources available on the Internet and enable them to participate in learning through ICTs.	IDRC	- Integrate wherever possible ICT awareness raising, training and application into the vocational training programmes run by the Ministry of Educations and supported by GTZ - Support the promotion of non-cash money transfer (e.g. to the telecom or the electricity provider etc.) as soon as the financial sector is ready to handle such transactions (supported by KfW and GTZ)
	Multi-Purpose Community Telecentre	ACACIA	- Support government bodies and associations in setting standards for various IT professions
Human capacity building / education	Establishment of Publications and Information Centre (PIC) designed to facilitate the transition of the curriculum and research activities at the Makerere Medical School to a community health-based curriculum	IDRC	- Support attraction and encouragement of Ugandan scientists and engineers who have engaged in successful ICT application and development in other countries to come to Uganda and become agents of technology transfer
	ConnectEd provides an ICT-based curriculum to the Institute of Teacher Education Kyambogo (ITEK) and a network of ten Primary Teacher Colleges (PTCs).	USAID	
	Makarere ICT programme: the country's most important university obtains a campus-wide LAN that is connected to a dedicated 256Kbps and developed an overall strategy to apply ICTs within the university's ongoing research programmes, its administration and curricula to provide distance learning facilities and ICT related courses	USAID, NORAD, SIDA, ADB	

Annex: Uganda – Activities around ICTs (continued)

	Ongoing Activities	Donors	Potential Contributions	
Main Areas	Human capacity building / education (continued)	Distance Learning Centre aiming at professionals of the government and professionals of development related institutions	The World Bank	
		Training of Acacia Project Officers and UNCST accountant in IDRC's financial planning procedures in order to improve efficiency of ACACIA project	IDRC	
		Training on state-of-the-art software and database programming	ISCO	
		- Follow-up training on Online Coaching for specialists in Remote Sensing and Geographic Information Systems (GIS) - LAUNCH-WEB-SCOUT: a path-finder to briefly commented Internet resources focusing on different topics of University Change Management.	DSE	
	ICT enterprises / entrepreneurship	Private Sector Partnerships in ICTs: explore ways of enhancing private sector participation in the development of ICTs in Uganda	IDRC	
		Modernising the financial sector by promoting the development of an electronic environment for banks and related institutions that will facilitate e-commerce, lower transaction costs and allow Ugandan financial institutions to join international financial networks.	SIDA/GTZ	
		Global Technology Network supports the co-operation between US-American SMEs and Ugandan enterprises through the provision of a web-based database which helps firms at both ends to find co-operation partners	USAID (similar projects by British, Danish and Italian dev. ass.)	
	Local content and applications	Multi-Purpose Community Telecentre Project	IDRC / UNDP / ITU	- Support the establishment of SMS subscriber services as a PPP with MTN Uganda and CGIAR's Foodnet
		Support for the court-of-justice system in Uganda includes the rationalisation of work routines and procedures through the introduction of an IT based case administration and information system	Royal Danish Ministry of Foreign Affairs / DANIDA	
		Support for the institutional development and building of capacity of the Uganda Bureau of Statistics using ICTs		
	FOODNET: a regional agricultural research and development network focusing on market-oriented research and sales of value added agricultural products. Info is both gathered and made available (amongst other ways) through ICTs	CGIAR-System		
	Support NPOs, e.g. those focusing on people with disabilities by creating internet presences, compiling newsletters etc.	United Nations Volunteers		
Other Areas	Health	HealthNet, containing e.g. information on drugs, HIV and AIDS related issues, research for reproductive health and health care reforms	Various, a.o. GTZ	
		Telemedicine module of Multi-Purpose Community Telecentre Project in Nakaseke	IDRC	
		Establishment of Publications and Information Centre (PIC) designed to facilitate the transition of the curriculum and research activities at Makerere Medical School to a community health-based curriculum	IDRC	
		Enhancing the ICT capacity of civil society organisations, especially those which provide sexual and reproductive health (SRH) - and in particular HIV/AIDS - services and information.	DSW / UNFPA / The World Bank	
	Others (not within the centre of the DotForce Action List)	MIST: Spatial Management Information System (MIST) for monitoring Uganda's Wildlife Parks	GTZ	
	Report on ICT developments in Uganda	ITU		

6.5 Annex: Tanzania – Activities around ICTs

Overview about ongoing activities in the field of ICTs and summary of potential contributions

(Source: AIDA Database and in-country assessment)

	Ongoing Activities	Donors	Potential Contributions
E-strategy/policy	Support to the eThinkTank Tanzania and ICT policy formulation process	UNDP	- Support for Tanzania Communication Commission (TCC) the regulatory agency. Support in the form of a medium term expert assistance (potential agency: SES)
	Support to the Ministry of Communication and Transport	SIDA	- Further support of GTZ for Tanzania Revenue Authority (TRA) to develop an internal network and digitisation of services
	Support for e-governance activities	IICD; DFID	
	Support to donor co-ordination	UNDP	
Infrastructure	Telecommunication Restructuring Programme (finished)	World Bank	- Further involvement in financing infrastructure roll-out, especially to rural areas through financial co-operation (KfW, DEG)
	Support for Multipurpose Telecentres	IDRC, SIDA, ITU, UNESCO, DANIDA	
	Fibre optic links for internal communication of Tanzanian Railways Corporation	KfW	
	IP Infrastructure (national Internet Exchange)	DFID	
	Rollout of cellular network to selected rural areas	Donations by industry (e.g. Ericsson, Cisco, Mobitel)	
	ICT in vocational training	SIDA	
Human capacity building / education	IT training and education African Virtual University	IICD, IDRC, USAID World Bank, DFID, Australia	- IT awareness building for politicians, public servants, teachers etc. - IT-training for business people (such as IT@africa of CDG) - University partnerships in teaching and research (DAAD, BMBF) - IT training by German Industry
	ICT enterprises / entrepreneurship	Private sector support	DANIDA
Local content and applications	Promotion of local content Support of Tzonline	UNESCO DFID, UNDP	- Efforts by German development projects should be by default be documented in a way that enables easy access by electronic means to generated findings, solutions, products etc.
Health	ICT in health projects	DANIDA, GTZ	- Pursue GTZ plans to set up health information system with a hub at MUCHS

7.1 Annex: Peru – Strengths and Weaknesses

Note: + means strength, - means weakness

	Definiton	+/-	Infrastructure	Political Leadership and Support
National Strategies / ICT Policy	<i>A global strategy for massification of Internet use was developed and submitted to the Ministry of the Presidency</i>	+	Significant improvement in urban areas	Government realises importance of ICT
		-	Rural areas still do not have the adequate infrastructure	Support currently concentrated in Long Distance Education (Plan Huascanan)
Connectivity, Access and Costs	<i>This include fix, public and cellular phones, as well as internet access.</i>	+	Significant increase of teledensity, ISPs operating and cellular phones access	Government supports autonomy of Regulatory Agency.
		-	Prices are still too high in consequence of inadequate interconnection policy	Congress is currently strongly questioning the regulatory agency making it loose its autonomy. Conflict between Ministry of Communications and FITEL.
Participation in International Policy on ICT	<i>This includes participation and knowledge by the government of initiatives of DOT Force, ICANN, and ITU</i>	+	Sufficient infrastructure to benefit from international initiatives.	Some specialists of government know about them.
		-	There is no clear global plan of priorities in infrastructure. Currently most efforts are towards the Huascanan Plan and on the discussion between the Ministry of Communications and FITEL about the need of a backbone along the country	There is no clear position of government regarding these initiatives; knowledge and ideas are isolated and not coordinated.
Initiatives for ICT inclusion of LDCs	<i>Current initiatives on ICT and their development objective and impact.</i>	+	Significant improvement of urban and rural areas access which give infrastructure necessary to carry out public and private initiatives.	Political Support mostly in Huascanan Plan on long distance education.
		-	Rural areas still do not have the adequate infrastructure, and there is no consensus on the direction of governmental investment in infrastructure (conflict between FITEL and the Ministry of Communications)	Questioning of autonomy of OSIPTEL and of work carried out by FITEL.
Human Capacity Development / ICT in Education	<i>Current ICT literacy, efforts in ICT training and use of ICT in educational Training</i>	+	Significant infrastructure in terms of University programmes and institutes for ICT training. In addition ICT are starting to be used in distance education (Huascanan plan and private school initiatives).	Strong support by government.
		-	The quality of the programmes at institutes and universities is not good. There is also a lack of physical infrastructure to carry out the long distance education programme in the most needing regions.	Government support is not coordinated.

Private Sector Involvement	Market Structure	Other
Private sector willing to be involved	Users' demand and willingness to use and pay	Important Global view of the sector
Involvement still too partial	Supply still concentrated in few firms.	Not being followed by current government and still too generic. In addition there are a lot of isolated efforts.
All private sector and more competitive.	In fixed telephony there is still a monopoly, in cellular phones and Internet there is an oligopoly with a strong incumbent.	Cellular companies are showing interest in investing out of Lima and in rural areas.
Still problems with incumbent because of not appropriate regulation.	Lack of strength of regulatory agency: in rural areas FITEL had not progressed as expected.	Conflict between the Ministry of Communications and FITEL about the development.
Involved through private NGO's, Telefónica and the Instituto Peruano de Comercio Electronico		
Isolated efforts and no coordination.	Information and participation in these initiatives is too concentrated in few people and not in institutions.	Lack of knowledge about potential benefits to ICT's in the country. There is no institution in charge of coordinating those efforts.
Private NGOs as CEDEP, ITDG, and RCP are developing pilot projects on how to expand ICT use in poor cities.		High interest of private and public sector in developing projects with development content.
Most efforts are isolated and sometimes not realistic of needs of potential users.	The high concentration of the market (supply side) makes it difficult to coordinate and negotiate the development initiatives.	There no clear understanding of the need to share private and public resources in development projects of ICT (PPPs). Most efforts are isolated.
Significant interest of private sector to be involved in both human capacity development and in long distance education programmes (Huascarán Plan)		
Costs of private sector are too high and inconsistent with the reality of the country.	Too much variance in the quality of institutes and Universities with ICT related fields. Not yet a clear policy on how to develop the long distance education program (Huascarán Plan)	Informality of the software and no strong legislation for property rights protection.

Annex: Peru – Strengths and Weaknesses (continued)

	Definition	+/-	Infrastructure	Political Leadership and Support
ICT enterprise	<i>Scope and culture of domestic ICT enterprises and manner of ICT use by companies.</i>	+	Substantial increase of telephone penetration and providers of Internet services; and hence enormous growth of opportunities for firms and the demand for ICTs.	Government is aware of importance of ICT
		-	Presence of dominant firm in telephones is still affecting competition and therefore prices are still high. With respect to ICT business the main problem is property rights.	Government support is still not present in regulation and legal framework to support software producers.
ICT in Healthcare	<i>ICT projects on Health and HIV issues.</i>	+	Ministry of Health had developed a national network with 91 nodes along the country to concentrate health indicators in their central node.	There is support from the Ministry of Health.
		-	Information moves only in one direction towards central node, no yet any policy to disseminate information from central node to all other nodes along the country.	No clear support from the government.
Local Content and Applications	<i>Experiences in which local hardware and software applications are used.</i>	+	FITEL, together with NGOs are implementing pilot studies in rural areas with the objective of generalizing this experiences in the near future.	Most of Peru's Ministries and government agencies have web pages with online information as well as data on government expenditures. The final objective was to implement a single information portal to citizens. It is important to mention that during the current government the information has not been updated.
		-	Efforts are still too isolated and in pilot phase.	No clear support from the Government.
ICTs in Development Assistance Programmes	<i>Foreign organisation initiatives in the country</i>	+	Currently some pilot projects, for example: the Ashaninka project funded by IDRC, the Information Systems for Rural Development in Cajamarca by ITDG, projects funded by IDB. In 1995 the Programa Nacional de Informatica and Communications (PNIC) was established by the UNDP. It worked in the Ministry of Foreign Affairs, the National Institute for Consumer Defence, the Ministry for Women and Human Development and the Ministry of Justice. Finally CIP has launched a three-dimensional, online research laboratory to interact with teachers and researchers. GTZ has developed a portal "Box of Tools" for SMEs; they are also advising a project by a NGO (CEPES) in Huaral Valley.	The government is currently concentrating all possible assistance in the "Huascarán Plan" on long distance education for rural areas.
		-	Most programmes are isolated; they do not share neither infrastructure nor lessons learnt.	No clear support from the government.

Private Sector Involvement	Market Structure	Other
<p>Strong and active involvement. Telecommunication companies are competing by supplying different kinds of ICT products.</p> <p>Barriers established by the incumbent provider.</p>	<p>Strong demand and new entrance of companies in cellular and Internet services. Implementation of Telecentres in Urban and rural areas.</p> <p>Supply still concentrated in few firms.</p>	<p>Strong spillovers in the use of ICTs at all levels in firms. Associations of firms join to split costs of access for their members to ICT applications.</p> <p>Use of ICTs is still concentrated in large and medium firms and not in SMEs because of costs.</p>
<p>No private sector involvement.</p>	<p>All efforts are concentrated on the Ministry of agriculture.</p>	<p>There is no clear programme to inform people on HIV and other health issues.</p>
<p>Partial private sector involvement. On the other hand there is intensive presence of banking web sites and newspapers in the web.</p>	<p>Important latent demand for ICT services.</p>	<p>Growing number of users, still the online advertising market remains limited. Approximately \$ 2.5 million in 2001.</p>
<p>No a clear idea of potentialities of PPPs.</p>	<p>Concentrated in few organisations.</p>	<p>Initiatives from NGOs are still not to clear in terms of contents, too ambitious and there is no coordination between them.</p>
<p>Private NGOs are very active in the development of Pilot projects.</p>	<p>Important latent demand for ICT services.</p>	<p>Quiopunet is an example to help rural villages in case of natural disasters. It is funded by UN-INDNR</p>
<p>No clear idea of potentialities of PPPs</p>	<p>The high concentration of the market (supply side) makes it difficult to coordinate and negotiate the development initiatives.</p>	<p>Peru is sometimes perceived as a country that had a significant development in ICTs, which apart from not being true, also limits the presence of international assistance.</p>

7.2 Annex: Vietnam – Strengths and Weaknesses

Note: [+] means strength, [-] means weakness

	Definition	+/-	Infrastructure	Political Leadership and Support
National Strategies / ICT Policy	<i>5-year IT Master Plan in place; Telecommunication Act implemented but no overall strategy.</i>	+	Huge improvements relative to the low basis in terms of quantity, diffusion and quality. Rural roll-out enjoys high priority and was particularly successful. Strategy to expand electricity supply will on the mid run support spread of IT.	Government is committed to make ICTs a key part of social and economic life in the country.
		-	Lack of market oriented structures makes it difficult to judge on efficiency and sustainability of the telecommunication network expansion. Inflexible policy planning may even hamper faster developments.	Government awareness restricted to the young and progressive. There is a division between the latter and the old traditional party members as well as the middle ranking officials and those outside the urban centres.
Connectivity, Access and Costs	<i>Including fixed, public and cellular phones, as well as Internet access.</i>	+	Significant increase of fixed line teledensity. Access to Internet in all urban centres and many important towns through Internet cafés. Mobile cellular infrastructure increases steadily also outside the urban centres.	Government strongly supports universal and equitable access.
		-	Prices for individual access (connection charge / hand sets) are still too high for the majority of the population. This is particularly true for individual Internet access.	No autonomous regulatory agency.
Human Capacity Development / ICT in Education	<i>Current ICT literacy, efforts in ICT training and use of ICT in educational Training.</i>	+	Significant improvements were made in terms of universities getting connected and equipped; distance learning facilities are increasingly in place.	Strong support by government.
		-	Lack of infrastructure in most schools and outdated facilities in smaller universities.	Struggles between MOSTE and MOET; implementation problems.
ICT Enterprises and Entrepreneurship	<i>Scope of domestic ICT enterprises and kind of ICT usage by firms.</i>	+	Sector reform and Doi Moi attracted FDI and private sector initiatives that led to significant improvements in the availability of services also for non-ICT firms in the country.	Government realises the importance of ICTs for private sector applications: the establishment of high tech parks, e-commerce plans and the modernisation of the banking sector underline this.
		-	Internet utilisation is restricted to bigger companies and innovative entrepreneurs.	Government owns enterprises that enjoy preferential treatment.

Private Sector Involvement

SOEs as VNPT, VDC etc. work in close collaboration with government bodies.

Monopolist structure led by a consortium around the former P&T. Private sector involvement limited to state-owned enterprises. Foreign private investment again restricted to BCC and joint ventures with Vietnamese firms. Leads to a slow down in innovations and dynamics.

Necessity to increase private sector's role in light of regional integration and BTA with the US.

Reluctance and limited trust in parts of the government towards a further opening of the economy and the increasing power of the private sector.

Top of the range IT training provided by SOEs and few private firms. Scholarships available for top applicants.

Most formal education lacks practice due to the absence of computer labs etc. Private sector offers not affordable to most scholars. No standardised certifications and quality control.

Private sector open towards change and accepts offers from government.

Government and red tape often hamper private entrepreneurship.

Market Structure

Users' significant demand and willingness to use and pay for tc-services. In urban areas also high demand for value added and Internet services by the younger population. Openness of the society towards change.

Rural and remote areas of the country may lack more basic commodities.

In the IT market, i.e. the software development and services market the last years saw the emergence of a huge number of SMEs, some of them growing at significant speed.

Private sector increasingly important for ICT-relevant education and training.

De-facto monopoly in the telecommunication sector. Private sector's involvement limited to joint ventures etc. SOE also dominate the value added as well as the software development market. They also enjoy preferential treatment for government contracts.

Supply and application of services increased rapidly. Competition amongst ISPs and to a limited extent between cellular phone subscribers.

Dominance of FPT, Vietnam's biggest IT firm (ISP, development etc.). Formal training not competitive.

Local content dominated by government information, big firms and international agencies. Technical realisation (web design, etc.) beneficial for private sector.

Lack of real market development, especially in the telecommunication sector. Monopoly in Internet access provision.

Other

Censorship and firewall problems overestimated.

There are struggles between various government agencies and ministries over the responsibility for ICT related policies.

Market division of new services is regulated and gives investors security, i.e. long distance calls over IP, CDMA etc.

High literacy rate and motivation amongst the people.

The monopoly related to the country gateway keeps costs up and reduces speed due to profit maximisation of VDC.

Speedy spread of software increases ICT application and knowledge.

Target group are the young urban elites. Digital divide within society. English is the dominant language in both using and producing ICTs, i.e. software, databases etc.

Prevalent ignorance about copyrights and IPR hampers R&D incentives.

Annex: Vietnam – Strengths and Weaknesses (continued)

	Definition	+/-	Infrastructure	Political Leadership and Support
Local Content and Applications	<i>Country-specific production and use of ICT services .</i>	<ul style="list-style-type: none"> + Good ICT infrastructure, increasing production of hard- and software. - High concentration on HCMC and other urban areas. 	<p>Eagerness of the government to foster local content and also leadership in doing so: online information available on ministries, the parliament, laws, etc. Most information provided in good technical quality.</p> <p>Government related information mostly related to the central bodies.</p>	
ICTs on Development Assistance Programs	<i>Foreign organisation initiatives in the country.</i>	<ul style="list-style-type: none"> + A lot of efforts and involvement that is bundled by the government in its Master Plans. - Lack of co-ordination amongst ministries and donors. 	<p>Government is willing to co-operate and benefits itself a lot from the support given, be it through better communication means or through image gains.</p> <p>Ambitious plans face implementation problems that are due to governmental structures.</p>	

Private Sector Involvement

Numerous portals by private firms (ISPs and software developers); local software and hardware production existent, serving the huge domestic market.

Provision of information over the net not possible for smaller firms due to prohibitive prices and lack of demand. Protection of local industry hampers global competitiveness?

Market Structure

Lack of relevant content for the population. A lot of information is directed towards foreigners, emigrants and the national elite.

Other

Low number of PPPs.

Lack of evaluation of projects.

7.3 Annex: Lao P.D.R. – Strengths and Weaknesses

Note: [+] means strength, [-] means weakness

Definition	+/-	Infrastructure	Political Leadership / Institutional Support
e-Strategy / policy	+	New development in telecom networks of high capacity	The government started preparing a master plan and set up relevant authorities, e-ASEAN initiatives will urge the government to speed up related processes
	-	Low penetration rate in rural areas, infrastructure-first approach may result in over-capacity	Low awareness among political leaders, lack of coordination and increasing competition among authorities, lack of enforcement of regulations, control-oriented policy
Connectivity	+	Major network development in the near future making Laos a network hub in the region	Importance of communication infrastructure is acknowledged by political leaders
	-	Low rural connectivity, no backup route, capacity is not sufficient for increasing demand, (One-Gateway System for the Internet)	Planning and regulating authorities for the Internet and national ICT development are not yet firmly established, competition among relevant agencies leading to delays and confusion
Human capacity building / Education	+		Education is a priority area in the national development/poverty reduction strategies
	-	Low education level in general, lack of computer literacy and low English proficiency, lack of qualified teachers and teaching materials in local language, poor or non-existing physical infrastructure for e-learning	Top-down approach for ICT deployment may delay service to the public
ICT Enterprises / entrepreneurship	+	Recent development in telecom infrastructure	(New master plan and regulations are under discussion) Awareness of the potentials of the Internet in tourism and other commercial promotion activities abroad
	-	Lack of physical infrastructure, lack of established market institutions, uncertain business environment	Slow development of legal framework lags behind changes in technology and business environment, weak law enforcement for ICT sector, no explicit promotion / encouragement of use of ICTs among entrepreneurs
Local contents and applications	+		The Government has a few web sites with general information. Specialised information services on foreign investment and tourism are available. Awareness of the potential of ICT applications for distance education and training
	-	English proficiency is low among the population. No standard for Lao character set. Information for local people is not available in easily disseminatable forms	Little information for the public available from the Government in the Lao language

Private Sector Involvement	Market Structure	Other
Private sector is willing to get involved in the process	Increasing demand and awareness among public, users willing to pay for ICT applications, competitive market for ISP and Internet access	Attention on ICTs and development by donor organisations has increased recently
No involvement so far	Complicated market structure for telecom, unregulated Internet services	Lack of coordination among government as well as donor agencies
Incumbent operator is partly privatised	(introduction of competition by separating ETL)	Regional infrastructure development plans with Laos as a centrepiece
Private investments in infrastructure development are scarce due to uncertain business environment	Major developments depend on foreign aid or soft loans	Uncertainty about the technical feasibility and necessity
Private institutes offer basic as well as technical education and training	Demand for skilled workers is strong and will become stronger, NUOL will develop a new faculty focusing on ICTs	International NGOs are interested in ICT training and use of ICT in education
Courses are expensive and only available in major cities, qualified teachers and teaching materials in local language are much needed, training for proper operation and maintenance is not available	General perception of technicians as inferior to academics	
Active and adaptive private sector in non-telecom sectors	Unsaturated market / hidden demand	
Private sector involvement in telecom sector is low	Shallow markets do not allow specialisation of related firms. Most demand is from the public sector. Domestic market is not mature for e-commerce. Banking system is a major obstacle to e-commerce for export-oriented firms.	
Private sector maintains web portal for domestic businesses	Lack of materials in print lead a strong demand for audio-visual media such as TV, radio and VCD. Demand for educational / training materials is unmet.	Projects by donors often produce useful and locally relevant information.
Most contents are no more than web based catalogues. Private sector without incentive to develop contents for high costs and low compensation. Copyright and intellectual property rights are not observed	Low Internet / computer penetration makes content development less lucrative. Most demand comes from the public sector	

7.4 Annex: Uganda – Strengths and Weaknesses

Note: [+] means strength, [-] means weakness

	Definition	+/-	Infrastructure	Political Leadership and Support
National Strategies / ICT Policy	<i>Telecommunication policy defined, however no overall ICT strategy in place as yet</i>	+	Huge improvements relative to the low basis in terms of quantity, diffusion and quality, also in terms of roll-out into rural areas	Government realises importance of ICTs
		-	1/6th of the population in the Northern parts of the country will be excluded if no form of cross-subsidy is established	Plans seem too ambitious / ICTs as modernisation PR for an overcome and corrupt government?
Connectivity, Access and Costs	<i>Including fixed, public and cellular phones as well as internet access</i>	+	Significant increase of teledensity, access to Internet in the capital and particularly to cellular phone services; introduction of a rural communications development fund (RCDF)	Government supports autonomy of regulatory agency, no preferential treatment of the former incumbent
		-	Prices for individual access (connection charge / hand sets) are still too high for majority of population	Inability of the regulatory authority to provide sound leadership in facilitating a more enabling environment for ICT infrastructure development for smaller actors; it was argued that the UCC reacts to the desires of the two sole operators rather than to the needs of a fair competitive environment
Human Capacity Development / ICT in Education	<i>Current ICT literacy, efforts in ICT training and use of ICT in educational training</i>	+	Most schools (even secondary ones) do not have any form of ICTs present. Almost only private schools maintain computer labs	Strong support by government
		-	Only few universities and colleges enjoyed an increase in ICT equipment and application.	General structural problems of the education sector
ICT Enterprises and Entrepreneurship	<i>Scope and culture of domestic ICT enterprises and how firms use ICTs</i>	+	Diffusion of services fostered by private enterprises	Various government agencies involved in supporting application of ICTs in SMEs
		-	Access to Internet services is limited to urban areas	Lack of financial and human capacity to properly foster the spread of ICTs amongst enterprises
Local Content and Applications	<i>Country specific production and use of ICT services.</i>	+	Good telecom infrastructure	Eagerness of the government to foster local content and also leadership in doing so: online information available on ministries, the parliament, etc.
		-	Most efforts are supply driven, no local production of hard- and software	Restriction to the central government, lack of appropriate applications and relevant information provided over the government's web pages, lack of quality of services
		-	Lack of co-ordination and adjustment to the needs of the people / creation of white elephants	Dependency on external funding and own benefits make government unable to judge on appropriateness and usefulness of projects

Private Sector Involvement	Market Structure	Other
Most ICT developments induced through FDI and overseas loans	Strong demand for telecom services, high willingness to use and pay	
Dev. ass. loans seem to be necessary to spark interest of private sector	Limited demand and use of the competitive ISP and Internet Café market	Huge number of international donors participated in the restructuring of the sector, it is hard to trace, evaluation of efficiency is scarce
Private sector very active	In fixed telephony there is a duopoly; re. cellular phones and internet there is an oligopoly with a predominant ISP (Infocom)	The SNO has overtaken the former incumbent, indicating the market liberalisation
Problems with the smaller ISPs and NGOs that act as ISPs because of preferential treatment of big players	Big players dominate market and face only a weak regulatory agency	The former incumbent suffers from decades of mismanagement and lost most of its support from the government which hampers universal access
Key role in the provision of ICT related training		Focus of donors and also the private sector
Costs are too high for the general public and smaller firms to be able to afford those offered courses that are of valuable content and quality	Only few private firms offer proper training, most offer inadequate courses with low quality personnel and equipment; no standardised certification	Target group are the young urban elites
Mid to large scale farmers use telecommunications in the rural areas in the South of the country	Service provision and retailing of telecommunication services gained momentum quickly, banking sector will be strengthened through online applications	Creativity of the people, e.g. provision of generator driven recharge of batteries where there is no electricity supply
Generally low level of entrepreneurial skills in the country, particularly outside the capital city	No hard- and software production, concentration in urban areas; the enterprises in rural areas that may have demand for ICTs lack capital to use them extensively	People tend to destroy their own markets by simply copying business ideas, eventually leading to oversupply
Numerous portals and attempts to provide local content	Latent demand for information in all areas of society	
Limited private sector involvement. Poor quality of portals and no appropriate content. Mainly relevant for emigrants and foreigners	Very limited market due to lack of access of the vast majority of the population	
No evaluation of impact and actual strategy behind involvement; no local firms are involved		No evaluation as yet; difficult due to the lack of appropriate impact measures as well as limited duration of most projects

7.5 Annex: Tanzania – Strengths and Weaknesses

Note: [+] means strength, [-] means weakness

	Definition	+/-	Infrastructure	Political Leadership and Support
National Strategies / ICT Policy	<i>IT policy formulation in place; privatisation of incumbent; regulation of ICT sectors</i>	+ -	High requirements for telecommunication roll-out through licensing So far no coherent concept for roll-out beyond licensing requirements	Close co-operation with private sector in policy formulation. Officially leading Ministry of Communication and Transport is neither very efficient nor effective. Regulatory agency TCC is weak and not very competent.
Connectivity, Access and Costs	<i>Including fix, public and cellular phones, as well as Internet access.</i>	+ -	Significant increase of teledensity through boom in cellular phones. Rapidly growing public access to Internet in Dar es Salaam High costs for international connections (monopoly TTCL); low teledensity and Internet access in rural areas; missing independent national Internet exchange; low international bandwidth	So far no clear strategy for rural roll-out beyond licensing requirements; inconsistent regulation that is not directly aimed at strong market growth
Human Capacity Development / ICT in Education	<i>Current ICT literacy, efforts in ICT training and use of ICT in educational Training</i>	+ -	People are eager to get involved in ICT issues Relevant human resources are scarce. Weak educational system. Hardly any IT-based education at the school level	Some public institutions such as COSTECH or UCC are heavily engaged in the issue General structural problems of the education sector (lack of secondary education institutions)
ICT Enterprises and Entrepreneurship	<i>Scope and culture of domestic ICT enterprises and how firms use ICTs</i>	+ -	Easy and fast access to telecommunication through mobile phones and the Internet through browsing centres. Access to services is limited to urban areas	Deficient institutions, corruption, red tape and bad regulation constrain private sector development and the development of ICT-based services
Local Content and Applications	<i>Country specific production and use of ICT services and Internet content.</i>	+ -	ISPs offer Internet design and web space, main local language has Latin script Markets are too small to reach threshold for network dynamics to start	Online information available on ministries, the parliament, etc. in English and Kiswaheli
ICTs on Development Assistance Programs	<i>Foreign organisations' initiatives in the country</i>	+ -	A lot of efforts making the country a show case for ICT developments in Africa Lack of co-ordination and adjustment to the needs of the people, creation of white elephants (e.g. multipurpose telecentres), the existing fixed telecommunication network is in a particularly bad state	No priority setting and coherent strategy for donor involvement

Private Sector Involvement	Market Structure	Other
Driving force behind ICT policy formulation (eThinkTank); close co-operation with government		Reforms in many sectors (e.g. banking) needed in order to make national ICT policy effective
Private sector very active (even involved in "charitable" projects increasing connectivity). Foreign investment in telecommunication sectors.	Severe competition in cellular and Internet markets.	
TTCL is still dominant player, keeping price for international telephony high. Strict division between ISPs and data service providers.	Monopoly in fixed line telephony until 2005	
Key role in the provision of ICT-related training. International involvement (CISCO, NIIT)	Wide range of offers in many categories. Some courses offer international certificates.	Focus on a number of donors and also the private sector.
Costs are often high. Quality problem for many suppliers	More demand than supply	
Private sector is main driver behind development of ICT markets. ICT markets offer opportunities for entrepreneurship	Competitive and vibrant markets in most areas related to ICTs	Potential for entrepreneurship in rural expansion (public phone shops and browsing centres)
Generally low level of entrepreneurial skills in the country, particularly outside the capital city	Concentration of most ICT-related activities in urban areas	
Numerous portals and attempts to provide local content, appropriate local software adaptation	Content is mainly provided by media houses, government agencies, tourism industry and ISPs	
Low commercial viability due to small market size	Market small, most content still in English, local languages besides Kiswaheli not represented	
Foreign private sector actors are involved in promoting ICTs (e.g. CISCO, Global Catalyst Foundation) together with local actors in the market	Many donor active in promoting ICTs	Tanzania is part of international initiatives such as the G8 Dot force, improved connections to international donor community
No evaluation of impact and actual strategy behind involvement; no local firms are involved	No proper co-ordination of donor efforts	



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