

5 Evaluation of Telecommunications Demand Forecast in Lao P.D.R.

5.1 Results of the New Demand Forecast Study in Lao P.D.R.

For finalizing the telecommunication demand calculation for Lao P.D.R., demand results obtained by the previous two forecast methodologies (macro and micro demand approaches) are compared.

Table 5.1 The Results of Telecommunication Demand Forecasts in 2005, 2010 and 2015

			2000/ 2001	2005		2010		2015	
				Low	High	Low	High	Low	High
Fixed-line Subscribers	Macro	<i>Regression</i>	47,887 (2000)	178,490	194,480	278,460	296,270	415,090	483,340
	Micro	<i>Target Setting</i>		184,012 (3.07)		286,287 (4.16)		438,470 (5.56)	
Cellular Mobile Subscribers	Macro	<i>Regression</i>	13,773 (2000)	117,803	128,357	278,460	296,270	622,635	725,010
	Micro	<i>Target Setting</i>	29,545 (2001)	120,209 (2.00)		278,616 (4.05)		662,416 (8.40)	
Total Telephone (Fixed + Mobile)	Macro	<i>Regression</i>	61,660	296,293	322,837	556,920	592,540	1,037,725	1,208,350
	Micro	<i>Target Setting</i>		304,221 (5.07)		564,527 (8.21)		1,100,885 (13.97)	
Internet Subscribers and Hosts with DN	Micro	<i>Proportion of Fixed-lines</i>	Subscribers	18,400		42,900		109,600	
	Micro	<i>Proportion of Fixed-lines</i>	Hosts	761		1,217		2,151	

Note: Number in a parenthesis indicates teledensity in each target year.

Source: JICA Study Team

5.2 Evaluation of the Demand Forecast Results in Lao P.D.R.

Calculation results (approximately total one million units in 2015, together with fixed-line and mobile telephone subscribers) obtained both by Macro and Micro approaches are quite large comparing to the present subscriber numbers in Lao P.D.R. However, considering the recent telecommunication movement in the LDCs, particularly mobile telephone penetration, and historical growth rate of the subscribers in Lao P.D.R. (annual growth rate 20.1 % for the fixed phones and 50.8 % for the mobile telephones from 1996 to 2001), above results do not seem overly exaggerated.

In addition, it should be noted that telecommunications demand studies conducted by DETECON (1990) and ITU (1996) are only for forecasting the fixed telephone lines for Lao P.D.R. Those two studies do include neither the mobile telephone demand nor potential demand for fixed telephones in the country. Thus, the results of total telephone demand at target year (e.g. the year of 2005) in this

report is quite large comparing to the previous telephone demand results due to the above reasons.

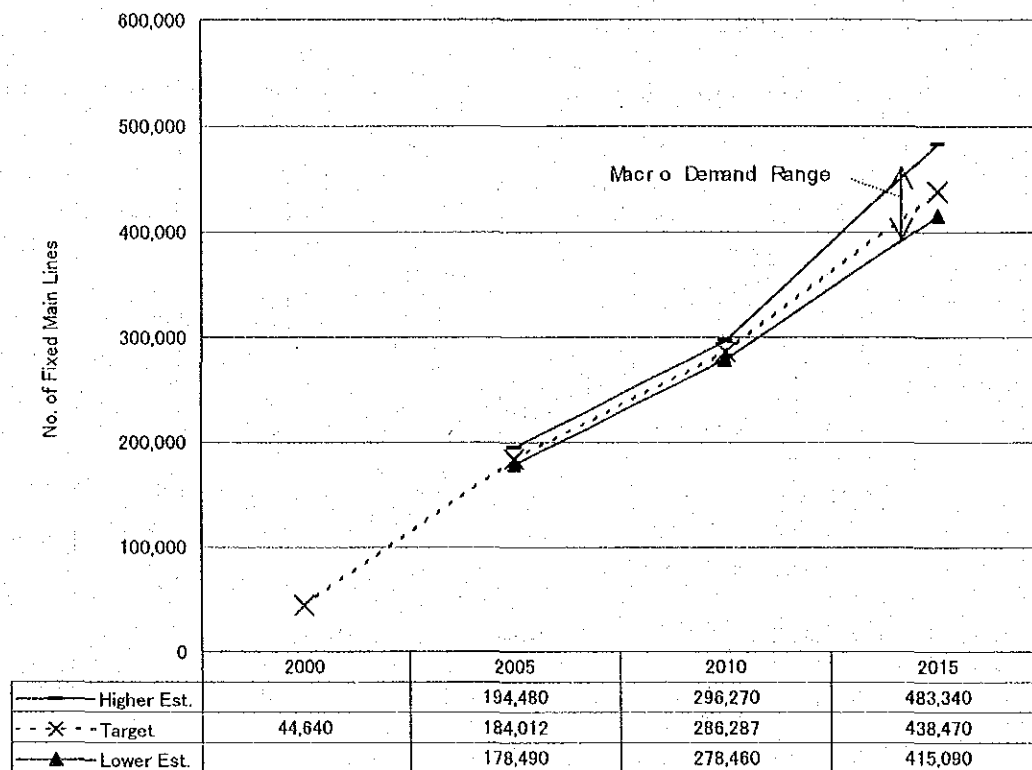


Fig. 5.1 Comparing results of Macro Demand Approach with Micro Demand Approach (Fixed Main Lines)

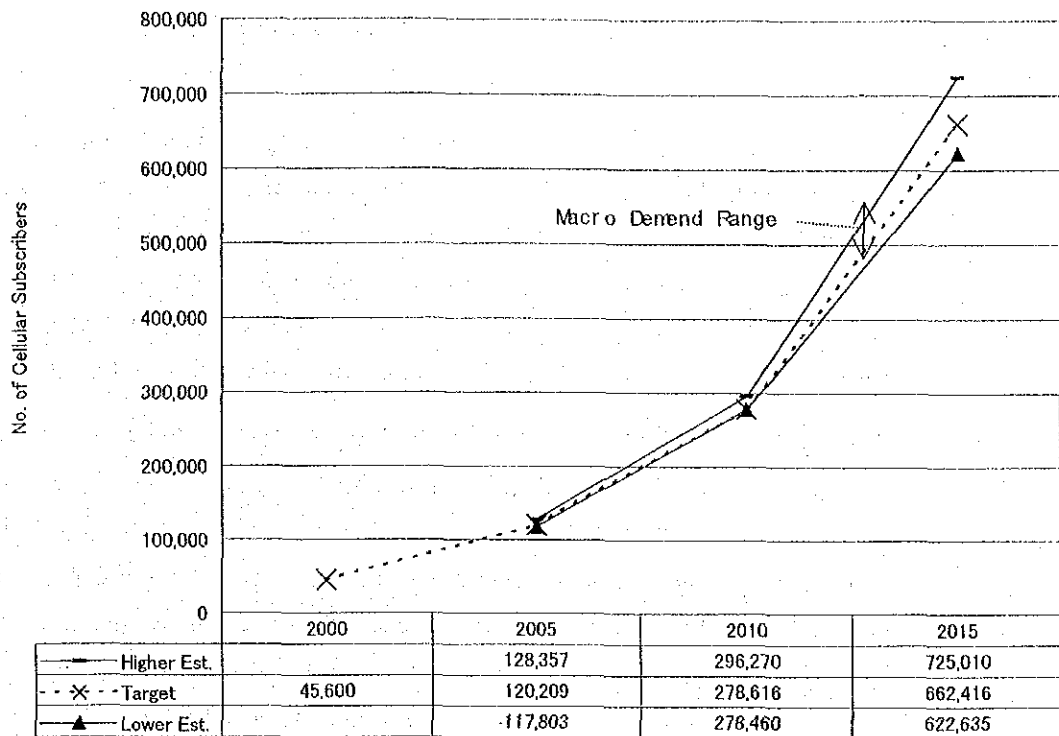


Fig. 5.2 Comparing results of Macro Demand Approach with Micro Demand Approach (Cellular Subscribers)

However, it should be noted that this demand forecast does not consider the constraints in the supply side. In order to meet the target, following four prerequisite have to be met:

- a) Capital Requirement
- b) Human Resource Requirement
- c) Availability of the Machinery and Material
- d) Efficient Management and Operation

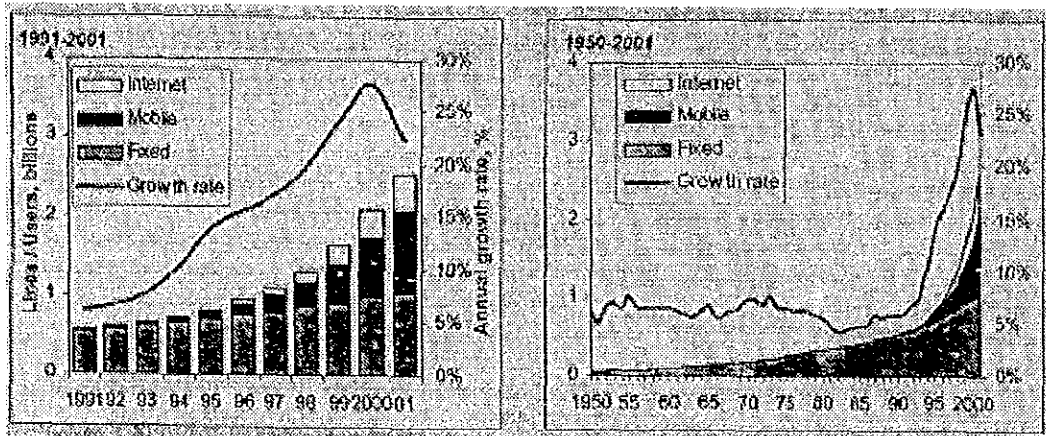
Constructing the network without neglecting above prerequisites will hamper the supplier from collecting enough revenue to cover the investment and result in institutional instability. Careful study has to be carried out before implementing projects to satisfy the estimated demand.

Appendix 1: Movement of Telecommunications Services in the World

ITU “World Telecommunication Development Report 2002” notices that there are three distinguished features in a telecommunications sector for a new millennium. These three trends are: (1) mobile overtaking fixed, (2) data overtaking voice and (3) developing markets overtaking developed ones. The major new phenomena and a case study in LDCs in the telecommunications sector are extracted below as backgrounds for telecommunications demand consideration in Lao P.D.R..

a) Rapid expansion of telecommunication sector at second half of the 1990s

Looking at the information and communication technologies sector as a whole (fixed lines, mobile and Internet, but excluding broadcast networks), the average growth rate in the sector between 1950 and 1990 was around 6 percent per year, but between 1995 and 2001 it averaged over 20 percent per year. Figure below shows the annual global user base (cumulative, billions) and growth rate for the telecommunication sector (fixed lines, mobile subscribers and Internet users), between 1991-2001 and between 1950-2001.



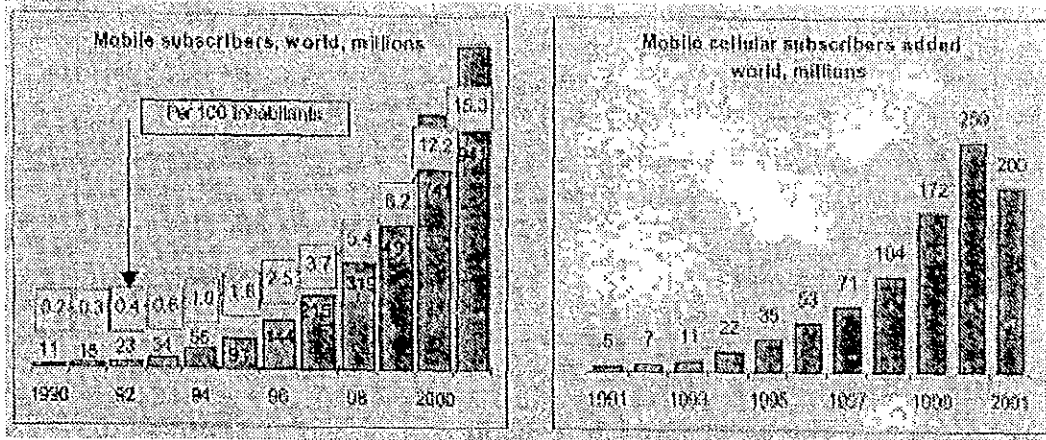
Source: ITU World Telecommunication Indicators Database

Figure 4.1-1 Rapid Expansion of Telecommunication Sector

b) Mobile overtaking fixed telephone subscribers, particularly in the LDCs

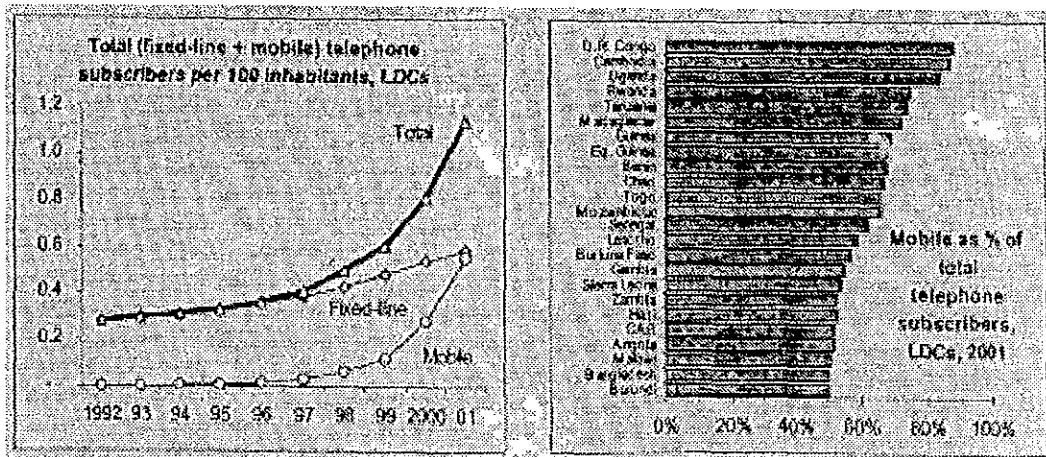
By the end of 2001, over 90 per cent of countries has a mobile network, almost one in every six of the world’s inhabitants had a mobile than fixed telephone subscribers. In developing countries, and particularly in the LDCs, mobile is increasing telephone access in a short period. It is predicted that mobile telephone subscribers will surpass fixed-line subscribers in the year of 2002. Particularly, growth rates of mobile telephone in Asian countries are strong

tendency. Growth has also been booming in Africa where more than half the countries now have more mobile than fixed telephone subscribers.



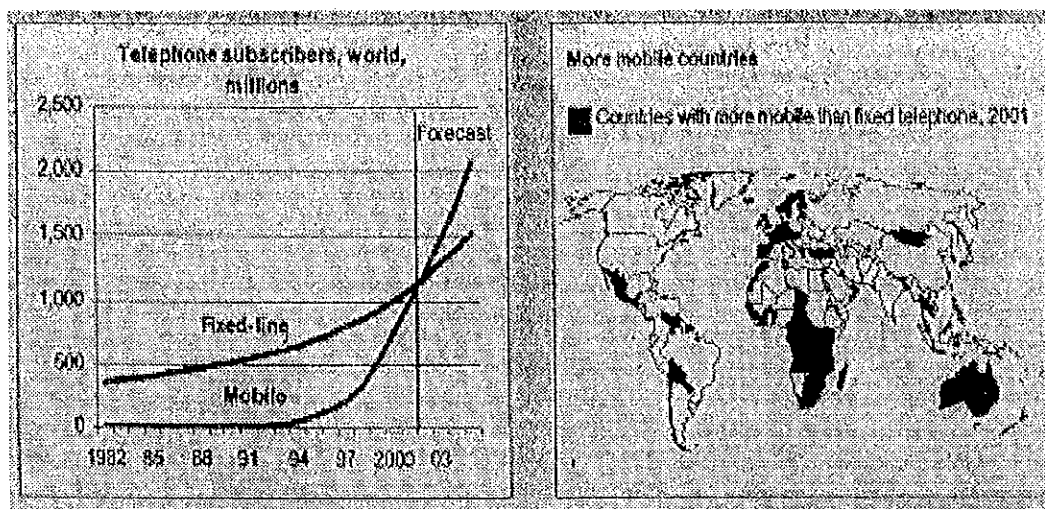
Source: ITU World Telecommunication Indicators Database

Figure 4.1-2 Rocket Booming of Mobile Cellular Subscribers



Source: ITU World Telecommunication Indicators Database

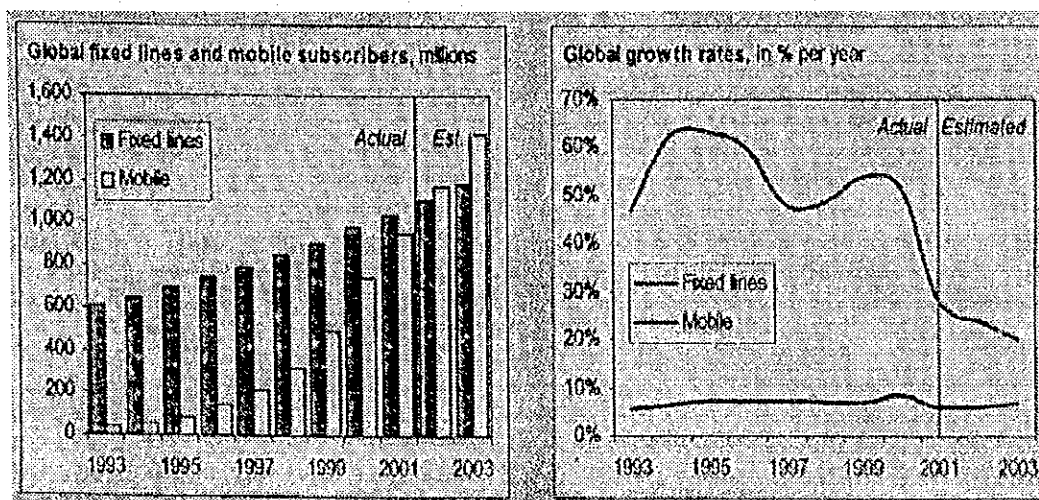
Figure 4.1-3 Fixed and Mobile Telephone Subscribers per 100 inhabitants, LDCs



Note: In the left chart, 1982-2001 is based on real data; 2002-05 on projections. In the right chart, 97 countries that are shaded had more mobile users than fixed lines, as at year-end 2001.

Source: ITU World Telecommunication Indicators Database

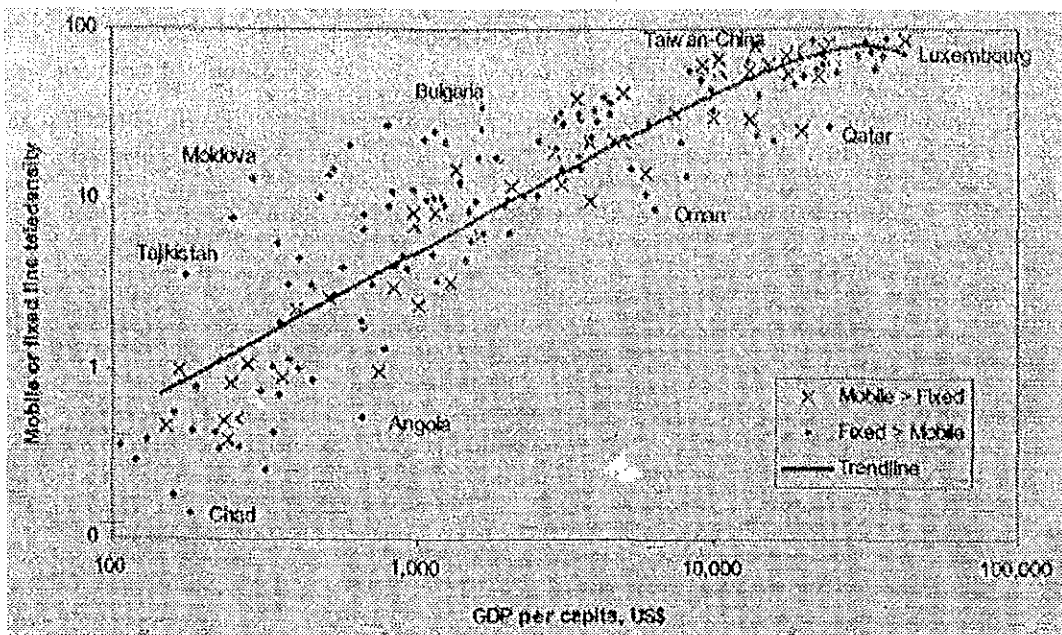
Figure 4.1-4 Crossover Point of Fixed-lines and Mobile Cellular Phones



Source: ITU World Telecommunication Indicators Database

Figure 4.1-5 Mobile Overtaking Fixed Lines

The widespread mobile cellular phones have forever changed the world's access to telecommunications, most significantly in developing countries. There are two main reasons for its expansion in developing countries. Firstly: the advent of mobile networks gave developing countries a much more cost-effective method of increasing telephone access, as shown by the much steeper trend lines for 2000 than 1990, especially in Africa and Central and Eastern Europe (refer to Figure 4.1-6). Some countries were able to expand teledensity despite falling GDP per capita. Secondly, the ability of a country to grow its mobile network to the point



Note: Each dot on the graph represents one of the 177 economies included in the analysis. Small economies without reliable data for 2000 were excluded. Selected outliers are highlighted. The intercept is set at zero. Logarithmic scales are used, as in the original Jipp curve. Those economies marked with a cross have mobile teledensity higher than fixed. Those marked with a diamond have fixed line teledensity higher than mobile.

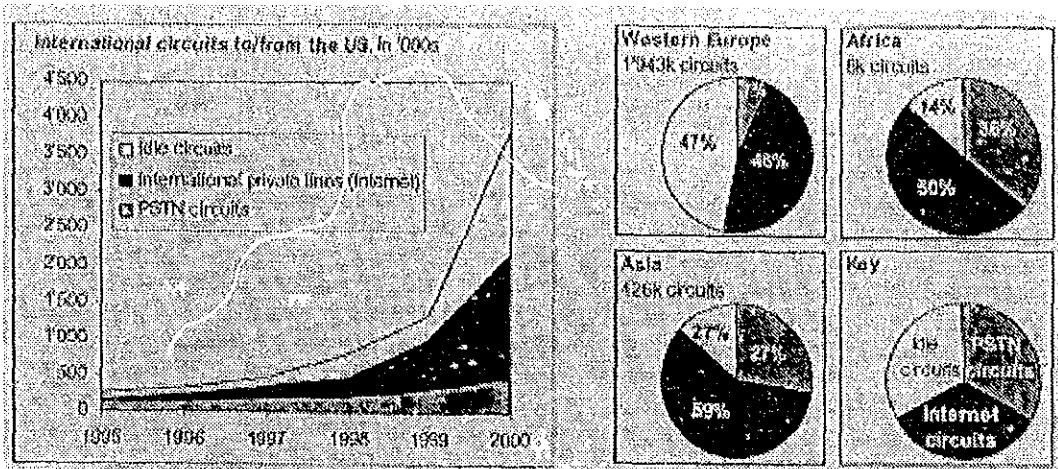
Source: ITU World Telecommunication Indicators Database.

Figure 4.1-7 Mobile or Fixed-line Teledensity/ GDP per capita, 2000

In terms of revenue, mobile now accounts for one third world wide, but more than half in a growing number of nations where there are more mobile than fixed subscribers. The report concludes that mobile is becoming the preferred mode for voice communications. The number of households with fixed telephone lines is shrinking in developed markets, while in many developing nations, fixed-line penetration will never reach levels that developed countries once attained. This raises a new paradigm in terms of network development, marketing and strategy.

c) Data overtaking Voice Communication in Telecommunication Sector

It is widely believed that the volume of data transmitted worldwide now exceeds the volume of voice traffic. However, it is difficult to prove this assertion definitively. During 1998 and 2000 in the USA, the number of PSTN circuits doubled, but the number of international private lines grew fivefold. These lines are used mainly for Internet and other data traffic. In some regions, such as Europe, PSTN voice circuits now account for less than 10 percent of total capacity on the trans-Atlantic route. The crossover between data and voice is significant for the long-term future of the telecommunications industry.



Note: The data recorded are for 166 international facilities-based carriers reporting to the FCC. This is estimated to account for the vast majority of international circuits worldwide. Each circuit counted is a 64 kbit/s equivalent. International private lines are generally used for Internet traffic. A small number may be used for other purposes, eg. Other types of data or private network. "Idle" circuits are those that are not currently in use. It does not include the much larger number theoretically available once bought into service (so called "dark fiber").

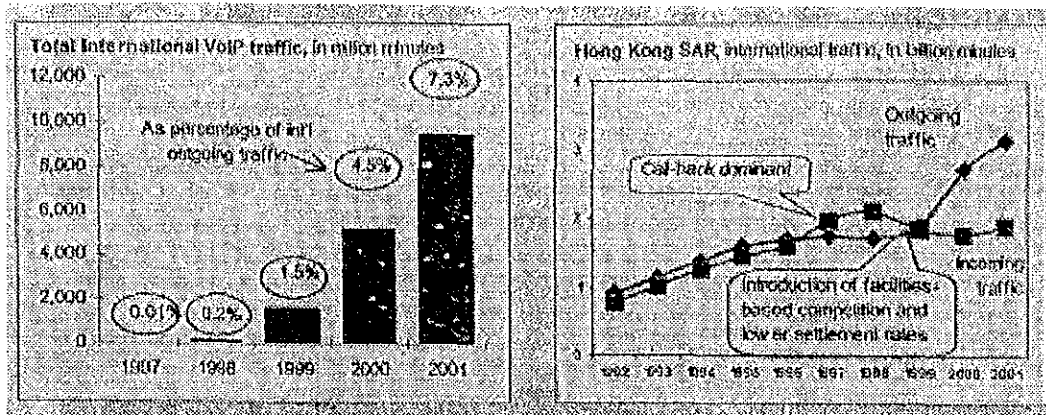
Source: Adapted from FCC International Circuits Report.

Figure 4.1-8 Data Crossover Point

By the late 1990s, as the Internet grew in significance, to the extent that there are now more international leased circuits in use for the Internet than for the PSTN, an increasing share of voice traffic shifted to the Internet, to be carried as Voice over IP (VoIP). It is estimated that international VoIP traffic amounted to almost ten billion minutes in 2001.

Now, in an era of overcapacity, prices for long-distance and international capacity are falling precipitously and even companies that own such capacity sometimes find that it is cheaper to buy capacity at spot market prices than to use their own facilities.

Looking ahead into the future, the majority of international calls may be made from, and delivered to, handheld devices. Those same devices will receive updates from websites and real-time video streams from multiple sources around the globe. Radio is now being increasingly used to provide access networks, while wired networks provide the long-distance component.



Note: The figures for international traffic in Hong Kong SAR are for the fiscal year.
 Source: TeleGeography Inc. and ITU (left); Office of the Telecommunications Authority (OFTA), Hong Kong (right)

Figure 4.1-9 International Voice over IP traffic, 1997-2001

Compare a typical Internet user with a telephone user. The bandwidth requirements of the former are likely to be about 18 times higher than those of the latter. As the Internet is used more and more for streaming media (e.g. audio, video, MP3 files), and as websites make more use of multimedia, Internet User's requirements for bandwidth will increase substantially.

Table 4.1-1 Relative Bandwidth Requirements

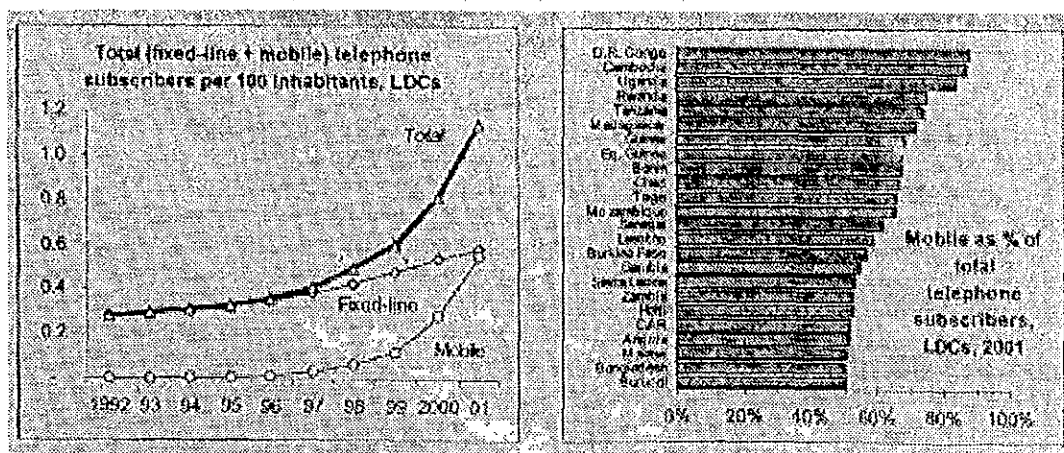
Typical usage	Duration and volume	Bandwidth per month	Relative size
Voice telephone user	6 hours per month; 8 kbit/s duplex	350 Mb	•
Current Internet user	30 hours per month; 56 kbit/s downstream; 4 kbit/s upstream	6.5 Gb	••
Future Internet user (streaming media)	50 hours per month; 1 Mbit/s downstream; 56 kbit/s upstream	190 Gb	••••

Source: ITU

d) Shrinking of the Digital Divide and Increasing of Internet

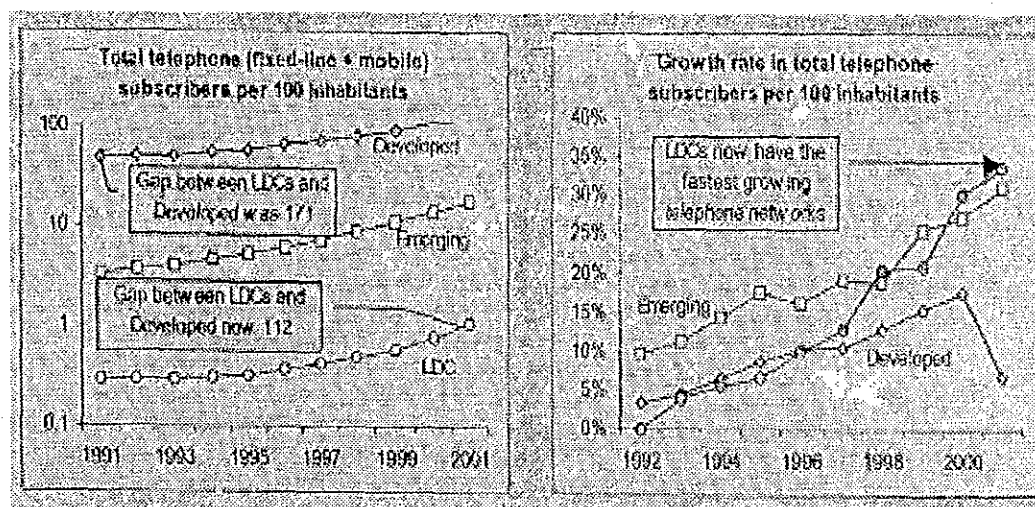
The digital divide usually reflects the income, health and education divides that are prevalent within and between countries. The root cause of these disparities is

poverty, and the relation between wealth and ICT access appears obvious. By the end of 2001, 24 LDCs had more mobile than fixed subscribers. In many cases, the transition took a little over a year, meaning that more mobile telephone users were added to the network than countries had been able to install since their independence. The rapid growth of mobile has also boosted total telephone penetration in the LDC's to over one in 2001 -an important psychological threshold—and is reducing the gap between LDCs and other countries.



Source: ITU World Telecommunication Indicators Database

Figure 4.1-10 Fixed and Mobile Telephone Subscribers per 100 inhabitants in LDCs, 1992-2001

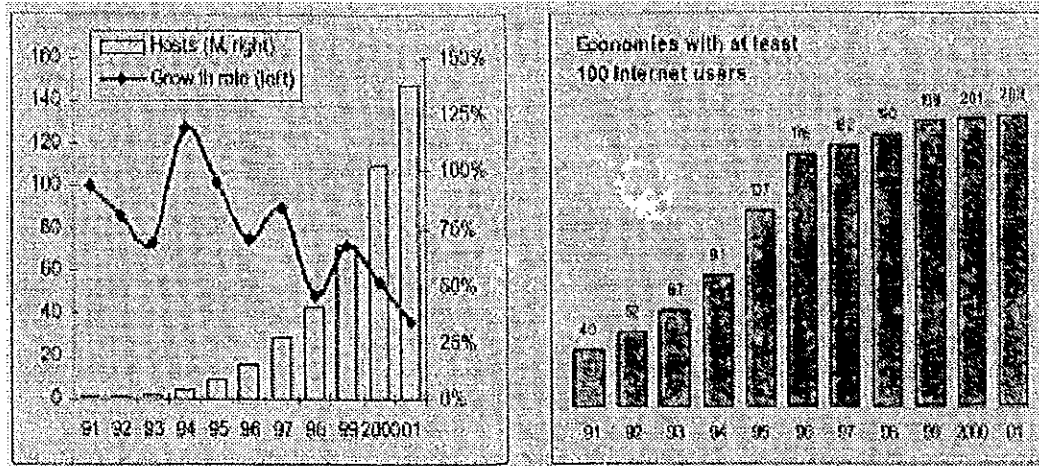


Note: Left chart is logarithmic. Developed refers to Australia, Canada, the European Union, Hong Kong SAR, Iceland, Japan Korea (Rep.), New Zealand, Norway, Singapore, Switzerland, Taiwan-China and the United State. LDC refers to the 49 least developed countries. Emerging refers to all other countries.

Source: ITU World Telecommunication Indicators Database

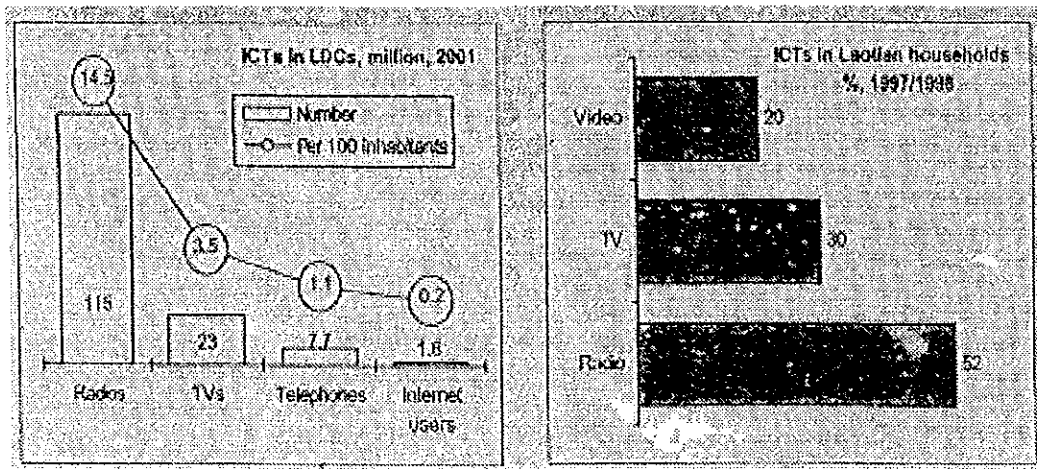
Figure 4.1-11 Total Telephone Subscribers and Growth Rate by Country Grouping

A lack of nationwide telecommunication infrastructure or costs was also found to be barriers to mobile expansion and Internet access in the developing countries. However equally important were 'soft' factors such as lack of awareness, shortage of content and language barriers. The 85 percent of today's population living in developing countries represents some 35 percent of mobile users and makes up only 25 percent of the world's Internet users. However, mobile and Internet sector has continued its steady expansion. The Internet doubled in size from a quarter to a half a billion users. More than 200 economies are now connected to the Internet.



Source: ITU World Telecommunication Indicators Database, Network Wizards

Figure 4.1-12 Internet Growth

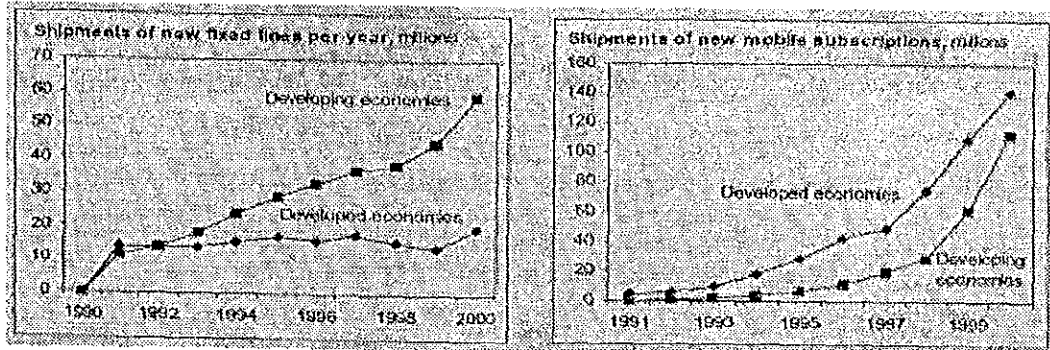


Source: ITU World Telecommunication Indicators Database, and State Planning Committee (Lao P.D.R.)

Figure 4.1-13 Information and Communication Technologies in LDCs

e) Developing Markets overtaking Developed Market

In 2000 developing economies accounted for three out of every four new lines installed. For new mobile phone subscriptions, the crossover had yet taken place in the old millennium. But in 2002, it is likely that more mobile phone users will be added in the developing world than in the developed one. The crossover will probably occur for new Internet users too some time around the middle of this decade.



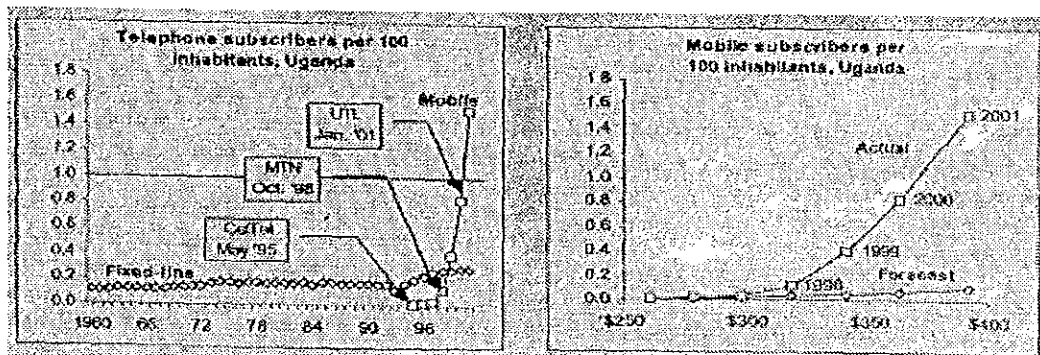
Note: "Developed" economies are defined as the 15 Member States of the European Union, plus Australia, Canada, Hong Kong SAR, Iceland, Japan Korea (Rep.), New Zealand, Norway, Singapore, Switzerland, Taiwan-China and the United State. "Developing" economies are all other Economies.

Source: ITU World Telecommunication Indicators Database

Figure 4.1-14 New Fixed-lines and New Mobile Users added each year, 1991-2000

f) Case Study in Least Developing Countries

Uganda's overall telephone density increased almost eight times between 1995 and 2001, rising from 0.21 telephone subscribers per 100 people to 1.63. One reason for this growth is that wireless networks are quick to install- an important consideration for a new start-up, which needs to develop revenues quickly. Another is the use of prepaid cards since most Ugandans would not meet the financial criteria for post-paid subscription- based service.



Note: In the right chart, the callouts show the dates that different mobile operators entered the market

Source: ITU World Telecommunication Indicators Database

Figure 4.1-15 Uganda's Mobile Revolution

Uganda's impressive results hold a number of lessons for other least developed countries:

- i) Competition stimulates rapid growth. There is a direct link between the number of operators and network growth. Almost all LDCs that have managed to expand their mobile networks rapidly have done so with multiple operators.
- ii) Mobile penetration does not appear to be heavily dependent on income in the early stages of development. Instead there is a strong desire for communications and perhaps also significant hidden wealth that does not show up in official statistics. Prepaid cards help those that would not qualify for post-paid subscription. Thus LDCs do not need to be mired in telecommunications poverty.
- iii) Mobile is helping to eliminate waiting lists. For the fixed-link network, potential users have to wait for the incumbent to lay copper in the ground to reach them. With a mobile network, consumers can just buy a mobile phone and start using it as soon as the first base stations are in place. The investment burden shifts from the state to the consumer.

The lesson of Uganda is being widely applied across other LDCs. There is no longer any excuse for a country not to be able to replicate what has happened in Uganda. All it takes is the political will to make it happen. The examples of Uganda, as a developing country, and Finland, as a developed one, got to show that mobile can be an effective means of achieving social policy objectives like universal access. To make this happen successfully, policy-makers and regulators need to turn their attention from fixed lines to mobile, and to gear their policies appropriately.

g) Implication to Lao Telecommunication Sector by the New Telecommunication Feature in the World

Mobile is the largest telecommunication network in many countries, particularly lower income nations. Considering the critical importance of telecommunications, Lao governments should encourage their mobile operations as much as possible. ITU report concludes that the goal for the twenty-first century should be to achieve "everywhere, all-the-time, everyone" communications instead of the goal to achieve "anywhere, anytime, anyone" communications in the twentieth century.