Factors that Influence Growth of Teledensity in Least Developed Countries

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Abstract

While having the lowest number of main telephone lines for every one hundred inhabitants (teledensity) over the last decade, the Least Developed Countries (LDCs), have the highest average pre-tax operator profitability in the world. Many LDCs have already opened their terminal equipment markets to competition and some have also done this with data and value-added services. Furthermore, LDCs are greatly behind other regions of the world in utilizing information and telecommunication technologies.

This paper examines 48 LDCs worldwide with teledensity of less than one. The problems and strategic actions for growth in teledensity are discussed. Also the opportunities for utilizing information and communication technologies to solve priority problems and to realize sustainable development in the region are examined.

Specifically, the framework and findings suggest that increased investment in telecommunication technologies is not a major determinant for growth of teledensity, but that higher GDP per capita and higher contribution of the service sector share to Gross Domestic Product (GDP) of LDCs are major determinants for growth of teledensity.

Keywords: Teledensity, Telecommunications, LDCs

BRT Keywords: BA, BD

Introduction

Least Developed Countries (LDCs) are defined as low-income countries that are suffering from long-term constraints to growth, in particular, low levels of human resource development and severe structural weaknesses - economically, socially, and politically - (Austin, 1990). These countries are particularly ill-equipped to develop their domestic economies which are vulnerable to external shocks or natural disasters.

In a study carried out by the International Telecommunications Union (ITU World Telecommunication Indicators, 1995), LDCs were presented to be among the least developed in terms of the state of their telecommunication networks and limited range of services offered.

The study shows evidence to suggest that LDCs are falling further behind other developing countries in the race to construct modern telecommunication networks. For example, as far back as 1984, among commonwealth countries, Singapore (a developing country) generated the fourth highest telecommunications traffic after the UK, Australia, and Canada (developed countries), as opposed to LDCs that currently have less than one telephone for every 100 inhabitants (Eward, 1984).

The same ITU study mentioned above shows further evidence that the falling of LDCs behind other developing countries in the race to construct modern telecommunication network arises not so much because they are not installing the latest equipment - in many cases the LDCs have modern, state-of-the-art digital networks - but rather that they are not expanding fast enough to close the gap with other developing countries. This implies that although these LDCs are investing in the latest equipment, there should be other reasons why they are not expanding fast enough to close the gap.

This leads us to our first hypothesis:

H1: Increased investment in telecommunication technologies is not a major determinant for growth of teledensity.

There also exist a very wide gap between the telecommunications facilities of developed countries and those of the LDCs. Data from the International Telecommunications Union (ITU) included in this study show the average level of teledensity among the LDCs is 0.29. This means just over one telephone main line for every 350 people. The total number of telephone main lines in the 48 LDCs stand at about 1.5 million (just over one percent of the total number of lines in the United States, even though the United States population is less than half that of the LDCs combined).

LDCs are now gaining considerable international attention when it comes to wider connectivity (Avgerou, 1998). Those residing in these countries have acknowledged the tremendous impact of electronic communications on development (Rorissa, 1996). A survey undertaken in Ethiopia, Uganda, Zambia and Senegal on the impact of electronic communications technology under a project funded by the United States Association for International Development (USAID) shows that "users are realizing the potentials of full Internet connection". For example, academic and research institutions have been able to conduct joint projects effectively, improve resource mobilization and carry out research between distant sites inexpensively (McClelland, 1998).

Several studies have been conducted which examine the link between teledensity and socio-economic factors. In particular, the International Telecommunications Union's CCITT (International Consultative Committee on Telephone and Telegraph) has sponsored several studies which establish a strong correlation between teledensity and variables such as Gross Domestic Product (GDP), as well as a positive relationship between teledensity and economic development. Conversely the same studies found a negative correlation between teledensity and population size. The results indicated that as GDP increases, telephone density increases more rapidly (Saunders et al, 1983) and that as the population size increases telephone density decreases.

Nevertheless these studies have been carried out in a global perspective without focusing on LDCs in particular. This study goes further to examine the relationship

between GDP per capita and teledensity for LDCs, as well as the relationship between population size and teledensity for LDCs. This leads us to our second hypothesis:

H2: A higher GDP per capita for a LDC will lead to a higher level of teledensity.

Other studies that have examined the relationship between teledensity and socio-economic factors suggest a strong correlation between changes in international telecommunications traffic over time, the number of tourists per year, and the volume of international trade. One such study, conducted by Yatrakis (1972), suggests that the volume of trade (measured as the dollar value of imports and exports) is an important determinant of the demand for international telegraph and telex services. This however is beyond the scope of this study.

The World Bank has conducted a number of telecommunications studies using structural economic analysis. These studies model telecommunications as an input into the production process and postulate that telecommunications services are not equally important to all sectors of the economy. Various country studies suggest that telecommunications services are more intensively used in the secondary and tertiary sectors than in the primary sector. A 1950 CCITT comparison of employment and telecommunications in Germany suggests that although 25 percent of the economically active population was employed in agriculture, this sector accounted for only 7 percent of telephone lines and 4 percent of telephone revenues. Commerce and transport sectors (service sectors) employed 16 percent of the work force, but accounted for 39 percent of telephone lines and 41 percent of revenues. Other country studies confirm this result (CCITT, Blue Book, vol. 2, Geneva: ITU, 1965 as reported in Saunders et al, 1983). A 1969 United Nations (UN) input-output study of communications patterns in 20 countries in the 1960s suggests that communications output is primarily used by service sector industries, followed by manufacturing and mining (UN, International Comparisons of Inter-industry Data, 1969). The results suggest that communications-intensive industries tend to be characterized by high value added relative to other industries, and to produce final goods (Saunders et al, 1983). This leads us to our third hypothesis:

H3: A higher contribution of the service sector share to GDP in the economy of LDCs will lead to a higher level of teledensity.

The research presented here draws on the literature above in an important way. These studies have established a strong correlation between teledenstiy and various socio-economic factors. These results therefore provide a base from which to examine the relationship between teledenstiy and various socio-economic factors for both developed and developing countries in general. Other studies, as earlier mentioned, focused on developing countries in general. However, none has focused exclusively on the relationship between the teledensity and the above mentioned socio-economic factors for LDCs in particular.

In a nutshell, this paper is an empirical study to examine 48 LDCs worldwide with *teledensity* of less than one. The three hypotheses are summarized in figure 1 below:

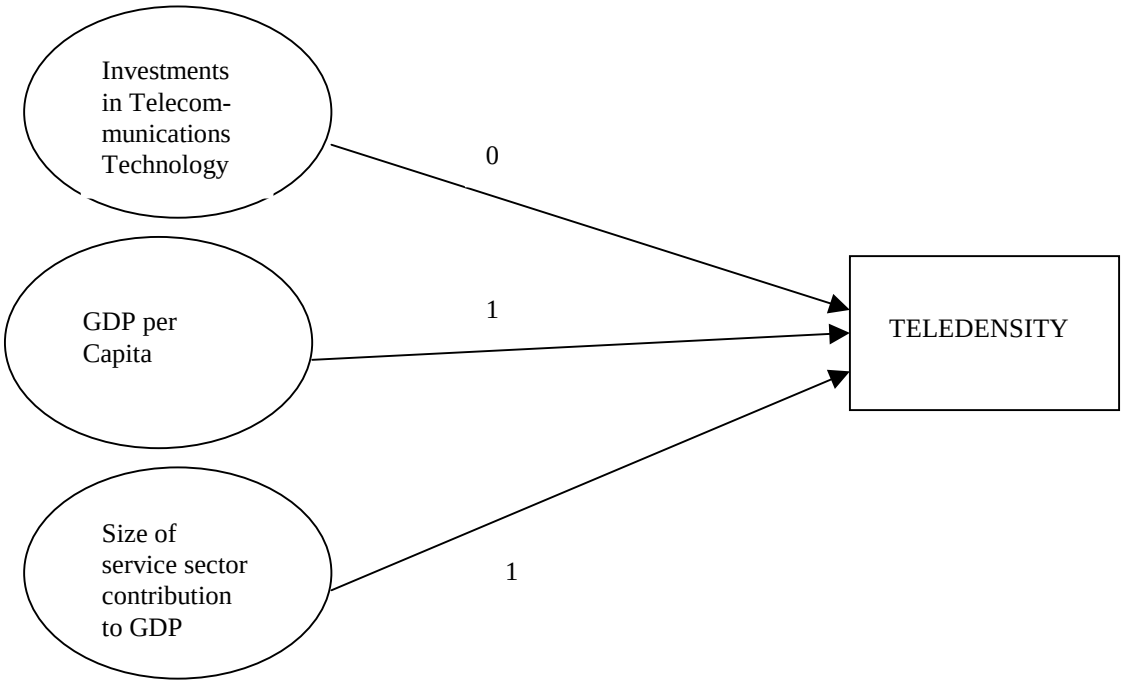

Figure 1: Hypothesized relationships between the model's independent variables (investment in telecommunication technologies, GDP per capita and contribution of the service sector share to GDP) and the model's dependent variable (teledensity).

What are the major socio-economic factors that contribute to the growth in teledensity for LDCs? Is continuous investment in telecommunications infrastructure the panacea to growth in teledensity for LDCs?

Research Methodology

Participants

Table 1a (see Appendix) contains the list of 48 LDCs, as currently defined by the United Nations General Assembly that was used for this study. The list was most recently updated in December 1998 with the "graduation" of Botswana and the addition to the list of two new countries, Angola and Eritrea. Of the 48 LDCs, 30 are in Africa, 13 in Asia and Pacific, 4 in the Arab Region and 1 in the Americas. There were 25 LDCs in the original group in 1971, indicating that the number has virtually doubled in 20 years. The criteria, used by the United Nations General Assembly, for inclusion of economies in the list of LDCs are discussed below.

Old criteria for inclusion

The original set of criteria for constructing a list of countries classified as LDCs was adopted in 1971. These were:

1. Per capita income per year less than US $200. This figure has been revised periodically, and stood at US $600 in 1998.
2. Share of industrial production in the Gross National Product (GNP) under 10 percent, adult literacy rate less than 20 percent.

New criteria for inclusion

New criteria for determining LDCs were established in 1994:

1. Population less than 75 million;
2. Per capita GDP less than, US $700 (average 1990- 92);
3. Augmented physical quality of life index (APQLI) less than 47;
4. Economic diversification index (EDI) less than 26.

These criteria were elaborated as follows:

1. **Population.** It was decided that from 1991 population size will explicitly be taken into account, and countries larger than 75 million, inhabitants should not be considered for inclusion in the list of LDCS. In the last two decades, it had only been implicit that LDC classification was meant to designate countries with small economics.
2. **Per capita GDP.** The relative level of poverty may be measured by per capita income.
3. **APQLI.** The Augmented Physical Quality of Life Index (APQLI) comprises four indicators: life expectancy at birth, per capita calorie supply, school enrollment ratio, and adult literacy rate.
4. **EDI.** The Economic Diversification Index (EDI) comprises the share of manufacturing in GDP, the share of employment in industry, per capita electricity consumption, and the export concentration ratio.

Inclusion rule

A country qualifies for inclusion if it meets all four formal criteria, namely population size, per capita income, the APQLI, and the EDI. This is subject to the judgement of the UN on the natural endowment index (agricultural land per capita, exports of minerals as a percentage of total exports, average rainfall, and rainfall availability), export of petroleum as a percentage of total exports, and official development assistance as a percentage of GNP.

Alternatively, a country will qualify if it meets the population and per capita income criterion, the APQLI or the EDI, is land-locked, is a small country with a population of 1 million or less, and suffers from frequent severe climatic risks such as drought, floods and cyclones. Inclusion will be subject to the judgement of the UN on other considerations. The inclusion rule is applied judiciously and a country may still he included in the list even if it does not meet all the four key criteria but is overwhelmed by three of them. Bangladesh, with a population greater than 75 million, typifies such an exception.

Procedures

A multiple regression model was used to predict the dependent variable, teledensity. Some potential independent variables originally tested include population size, GDP per capita, main lines, telecommunications investment and size of the service sector. Table 1b (see Appendix) has the values for the dependent and independent variables used in this study. No dummy variables were used in this model.

Below is a general linear regression equation developed to test the impact of the potential independent variables on teledensity and came up with the following form:

$$Teledensity = B_0 + B_1(TI) + B_2(GDP/c) + B_4(SSI) + E$$

Where:

TI = Investment in telecommunications

GDP/c = Gross Domestic Product per capita

SSI = Size of the service sector contribution to GDP

Per capita income is included as an independent variable to represent the overall level of development in each country.

The data for population are mid-year estimates from the United Nations yearbook statistics from 1980 through 1998. The data for GDP per capita are generally from the World Bank "World Development Report, 1998". They are current price data in national currency converted to United States dollars at current average exchange rates.

The data for main telephone lines, telecommunications investment, and size of the service sector are from the International Telecommunications Union (ITU) world database, 1998. Main telephone lines refer to telephone lines connecting a customer's equipment (e.g., telephone set, facsimile machine) to the Public Switched Telephone Network (PSTN) and which have a dedicated port on a telephone exchange. Note that for most countries, main lines also include public payphones.

Main telephone lines per 100 inhabitants (Teledensity) are calculated by dividing the number of main lines by the population and multiplying by 100. Telecommunications investment refers to the annual expenditure associated with acquiring ownership of property and plant used for telecommunications services and includes land and buildings. Size of the service sector is measured as the percentage contribution of the service sector to GDP.

Even though the LDCs fit a certain set of economic and social criteria, the differences among them could hardly be greater. Perhaps the most evident difference is in terms of population size (Table 1b), which ranges from the less than 10,000 inhabitants of Tuvalu to the 116 million of Bangladesh. There are also significant differences in teledensity and wealth: teledensity ranges from a high of 4.21 in the Maldives to 0.06 in Cambodia while GDP per capita ranges from over US$ 1,200 in Tuvalu to US$ 65 in Ethiopia.

Some outliers were identified and cleaned up from the data on GDP per capita.

All the variables (Table 2) were correlated in order to identify the event of any multicollinearity.

Table 2: Correlations of variables used in the model

Variable	Teledensity	GDP per capita	Telecom Investment (MUS$)	Size of service sector (% contribution)
Teledensity	1.0000			
GDP per capita	0.6521	1.0000		
Telecom Investment (MUS$)	-0.1430	0.0071	1.0000	
Size of service sector (% contr)	0.7600	0.5095	-0.0974	1.0000

N = 48

Results

Moments and quantiles for the dependent and independent variables used in this model were also calculated (Table 3). Teledensity had a mean of 0.80, a median of 0.34 and standard deviation of 1.05. The mean, median and standard deviation for telecommunications investment were $9.14 million, $5.80 million, and $11.97 million respectively. The size (percentage) of the service sector contribution to GDP had mean, median and standard deviation of 43.60%, 42%, and 11.90% respectively.

Table 3: Selected moments and quantiles for variables used in model (also includes data for population size and main lines – used to calculate teledensity. They are not used as variables in this study).

Variable	Mean	Median	Standard deviation
Teledensity	0.80	0.34	1.05
Population (millions)	11.60	6.05	19.57
Main lines (000s)	33.44	14.75	49.83
GDP per capita (US$)	423.62	325	310.34
Telecom. Investment (millions US$)	9.14	5.80	11.94
Size of service sector (% contribution to GDP)	43.60	42	11.96

$\underline{N} = 48$

In the hypotheses tests, there was a negative relationship ($\underline{r} = -0.14$, $p < 0.05$) between level of telecommunications investment and teledensity. Evidence presented in table 1b shows that many developing countries have been maintaining a high level of telecommunications investment. Nevertheless, a few LDCs, such as Gambia, Cape Verde and Nepal (table 1b), have experienced a high degree of growth in teledensity of which telecommunications investment was a major contributing factor.

Also as hypothesized, there was a fairly close relationship between GDP per capita and teledensity in LDCs ($\underline{r} = 0.65$, $p < 0.05$). Furthermore, when the relationship between GDP per capita and teledensity was plotted, one of the most noticeable observations was that the countries that were doing better than expected in terms of their income level had relatively small populations.

There was a positive relationship between the size of the service sector and teledensity ($\underline{r} = 0.76$, $p < 0.05$). Almost all of the LDCs with a teledensity over one had service sectors that contribute to over 50 percent of economic output (table 1b). It was notable that the level of teledensity appears to rise sharply after the contribution of the service sector to the economy surpassed 55 percent. This was evident in both cross-sectional analysis of the LDCs at the point in time as well as an analysis of one country over a period of time. For example, almost all of the high teledensity LDCs had significant service sectors. In the Gambia, teledensity remained level throughout the 1980s until the service sector reached 55 percent of the national economy in 1987 (table 4). Following that, teledensity rose sharply eventually surpassing one in 1990.

Table 4: Relating size of The Gambia's service sector to teledensity (1981 – 1990) (Source: International Telecommunications Union (ITU) world database, 1998).

YEAR	Size of service sector (% control to GDP)	Teledensity
1981	46	0.35
1982	48	0.36
1983	52	0.37
1984	51	0.35
1985	54	0.4
1986	52	0.52
1987	55	0.65
1988	54	0.71
1989	53	0.91
1990	57	1.1

Discussion

This paper focused on testing three main hypotheses:

H1: Increased investment in telecommunication technologies is not a major determinant for growth of teledensity.

H2: A higher GDP per capita for a LDC will lead to a higher level of teledensity.

H3: A higher contribution of the service sector share to GDP in the economy of LDCs will lead to a higher level of teledensity.

All three hypotheses, as per the results above, were supported. There was an inverse relationship between investment and teledensity but it still remains a major concern for LDCs. For example, the level of net foreign investment in 1992 was just US $245 million (IMF world economic report, 1993), equivalent to just over 1 percent of GDP. In some countries, the recent pattern has been one of disinvestment, with a net outflow of foreign investment. However, there are a couple of bright spots, notably in countries which have a high level of tourist investment (e.g. The Gambia, Solomon Islands) and countries which still retain strong links with a former colonial power (e.g. Vanuatu, Guinea).

One of the reasons why the LDCs are failing to attract much foreign direct investment is because of their poor inflation record (World Bank economic report, June 1998). No single country, of those for which data is available, has managed to keep annual inflation in single figures since 1987 and in eight of the countries, the level of inflation has exceeded 100 percent per year.

The results section presented a fairly close relationship between GDP per capita and teledensity in LDCs ($\underline{r} = 0.65$, $p < 0.05$). This should be a major concern for LDCs that generally have a very low average per capita income of US $283 per year. This is just 7 percent of the global average of US $3,980 per year. The level of growth in GDP at the start of the 1990s has been very disappointing, just 1.2 percent on average, and at least nine of the countries have seen GDP decline in absolute as well as real terms during this period.

The hypothesis that the larger the service sector's share in the economy of LDCs will lead to a higher level of teledensity is supported in this study. The service sector is one of the biggest customers of communication services typically accounting for over half of telecommunications operator's revenues. Service sector customers included industries

such as banking, trade, tourism and administration. Given that the service sector was such a heavy user of communications, one would intuitively expect a relation between the importance of the service sector in a national economy and the level of telecommunications development.

Although size of the service sector contribution to GDP was found to be highly correlated with teledensity, the unresolved question is whether services lift teledensity or whether telecommunications development leads to growth in the service sector. It is probably a bit of both. Since services are big users of communications, their demand will increase the telecommunications operator's revenues, allowing further network investment to take place. At the same time, good telecommunications infrastructure will tend to lower costs for the service sector, triggering expansion and attraction of new service industries.

This mutually beneficial relation between service and telecommunications suggests that the LDCs may want to encourage development of the service sector. Another strong reason for encouraging development of the service sector is the gains for the economy. Economic growth has been steady since 1990 for LDCs with significant service sectors (IMF world report, 1997). Growth in LDCs without large service sectors tends to be cyclical and dependent on commodity prices and other factors that vary from year to year.

One of the best ways of fostering growth in the service sector would be for LDCs to grant their telecommunications operators more independence. After all, the telecommunications industry itself forms an important part of the service sector especially in countries with sizable service sectors. For example, telecommunications revenues as a percent of GDP (table 1b) is 5 percent in Cape Verde, 4.5 percent in the Gambia, 6.1 percent in Kiribati and 9.2 percent in São Tomé and Principé. It is notable that all these countries have higher teledensities than other LDCs, they also have autonomous operating entities.

The telecommunications infrastructure and regulatory problems in LDCs

The two major difficulties in LDCs in expanding teledensity and embracing electronic communications are the low levels of infrastructure and regulatory barriers. LDCs lack the most basic telecommunications infrastructure (Adedeji, 1986). Coupled with low exposure to networking and low computing and information infrastructure, the unreliable telecommunication network makes most efforts in LDCs challenging. The gap between LDCs and the developed world continues to widen as a result of blockage by obsolete policies and regulations. Artificially high charges and outdated equipment exacerbate the situation.

The introduction and results sections of this study show that growth in teledenstiy of LDCs is the weakest in the world. With an ever-growing population the teledensity remains stagnant even if marginal increases in main telephone lines are achieved in some countries. Due to the small size of local telecommunications markets and policies, there are really few private foreign investments in the telecommunications sector. Some countries have shown a negative growth rate in teledensity due to socioeconomic

problems earlier mentioned, population growth, foreign debt, fall-off in export earnings and the need to import most telecommunications equipment (O'Neill, 1994).

LDCs telecommunications operators remain prime importers of telecommunications equipment. Ethiopia spends 99% of telecommunications investment on importing telecommunications equipment; Senegal spends 44% of the average annual telecommunications investment on the import of telecommunications equipment. The region also lags in the provision of business communication support such as packet switching and leased line including some other value-added services.

Maintenance of existing equipment leaves much to be desired. In some countries malfunctioning telephone equipment waits for months before a maintenance team arrives to the rescue. The maintenance process is slow even after problems are identified unless the team gets 'benefits' (a spiced term used for bribery). Lack of management plans for maintenance and low salaries opens the way to corruption and sluggish maintenance processes. Other external factors such as weather, roads, and sewerage tunnel building make maintenance much more difficult. The latter is a menace to the reliability of telecommunication networks.

ITU world telecommunications report, 1997, shows that over 80% of LDCs telephone switching is made up of analog equipment which is unreliable and difficult to network with computers. One of the challenges of LDCs telecommunications operators is how to successfully modernize their networks (Ogbe, 1990). Analog telecommunications equipment are becoming a pain for major telecommunications operators in LDCs due to high maintenance costs and lack of spare parts for systems that need to be phased out. The lack of reliability and inconvenience of analog networks for data communications is a regular drain on network operators.

Conclusion and implications for further research

National telecommunications operators continue to subsidize rural communications at the expense of international communications. This has created both high charges for international communications and blocked any effort towards deregulation and privatization; an area that was not addressed in this paper. It is my intent to carry out further research in such areas.

National telecommunications operators have continued to use rural communication or their cross-subsidization for the 'public' as a safeguard to privatization. Further research is also needed in this area to show whether or not rural access could be profitable.

The monopolistic and parochial culture of LDCs telecommunications operators is also reflected in the mounting tariff and awkward traffic situation in the region. The average telecommunications revenue per subscriber line in Europe is about US $770 while the average in LDCs is roughly the double of that at US $1,460 (Paltridge, 1997). Given the lower per capita income in LDCs the ratio of revenue in LDCs to that of Europe is extremely high. Restrictions further mount the high cost of telecommunications services. Statistics show that data transmission in Europe costs two to three times that of the US due to more restrictions in Europe. In LDCs, where restrictions are even higher, the costs are also exorbitantly high. Institutions and/or individuals are charged four to eight times that of Europe and four to twenty times that of the United States for the same

loop of calls. An unanswered question here is whether complete privatization will bring down these costs. My suggestion for further research here will be to use some developed countries, which have completely privatized their telecommunications industry, as a benchmark.

In some countries, the governments are the sole operator of telecommunications and ban the importation of telecommunications equipment. Consumers are denied the freedom to attach or own their preferred equipment for computing or communications to telephone networks.

Telecommunications administrations in many LDCs lack basic knowledge on key global trends in the telecommunications sector. Many telecommunications operators do not yet understand the impact of accessible services on the development of their networks in terms of increased revenue or in terms of their impact on economic and social development (Jensen, 1995). Their inability to foresee the rapid pace of technological innovations that eroded traditional distinctions between carriers and service providers remain as deterrents to wider network connectivity. Computer penetration in the PT&Ts (government department for telecommunications) office is very low; desktop computing is a new area. Their perception of data communications is limited to plain old technologies used in the banks and insurance sectors. It is difficult to find a national telecom operator with high caliber staff using innovative networking technologies such as Local Area Networks (LANs).

The low salaries and lack of incentives encourage skilled technicians to leave the telecommunications operator jobs (Minges, 1995). The turnover is usually high in the area of data communications.

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Source for Table 1a: United Nations General Assembly, December 1998
Sources for Table 1b: United Nations yearbook statistics, 1980 - 1998
World Bank “World Development Report”, 1998
International Telecommunications Union world database, 1998

APPENDIX

Table 1a: The 48 Least Developed Countries (the UN General Assembly, December 1998).

Countries	Africa	Americas	Asia & Pacific	Arab States	Year of Entry
Afghanistan			X		1971
Angola	X				1998
Bangladesh			X		1975
Benin	X				1971
Bhutan			X		1971
Burkina Faso	X				1971
Burundi	X				1971
Cambodia			X		1991
Cape Verde	X				1977
Central African Republic	X				1975
Chad	X				1971
Comoros	X				1977
Djibouti				X	1982
Equatorial Guinea	X				1982
Eritrea	X				1998
Ethiopia	X				1971
Gambia	X				1975
Guinea	X				1971
Guinea Bissau	X				1981
Haiti		X			1971
Kiribati			X		1986
Lao (PDR)			X		1971
Lesotho	X				1971
Liberia	X				1990
Madagascar	X				1991
Malawi	X				1971
Maldives			X		1971
Mali	X				1971
Mauritania				X	1986
Mozambique	X				1988
Myanmar			X		1987
Nepal			X		1971
Niger	X				1971
Rwanda	X				1971
Sâo Tomé & Principe			X		1982
Sierra Leone	X				1982
Solomon Islands			X		1991
Somalia				X	1971
Sudan				X	1971
Tanzania	X				1971
Togo	X				1982
Tuvalu			X		1986
Uganda	X				1971
Vanuatu			X		1985
Western Samoa			X		1971
Yemen				X	1971
Zaire	X				1991
Zambia	X				1991
Total 48	29	1	13	5	

Table 1b: Values for variables used in model (*also includes data for population size and main lines used to calculate teledensity. They are not used as variables in this study*).

Economy	Population (millions)	Main lines (000s)	Tele-density	GDP per capita	Telecom Investment (M US$)	Size of service sector (% contribution to GDP)
Afghanistan	22.10	29.0	0.13	125	4.1	30
Angola	10.00	53.3	0.53	995	13.7	27
Bangladesh	116.70	268.4	0.23	215	11.3	39
Benin	5.20	20.4	0.39	430	0.2	50
Bhutan	1.50	3.8	0.25	155	6.3	48
Burkina Faso	9.80	21.9	0.22	295	22.7	40
Burundi	6.00	15.6	0.26	170	0.8	35
Cambodia	9.60	5.9	0.06	215	10.0	29
Cape Verde	0.40	15.3	3.83	835	7.1	75
Cen. Afr. Rep.	3.20	6.7	0.21	390	8.2	43
Chad	6.10	4.6	0.07	200	50.7	35
Comoros	0.50	4.0	0.76	485	0.9	50
Djibouti	0.60	7.3	1.28	855	8.2	54
Equatorial Guinea	0.40	1.3	0.29	360	11.3	36
Eritrea	3.40	20.0	0.59	430	7.9	53
Ethiopia	53.30	132.5	0.25	65	11.0	44
Gambia, The	1.00	16.3	1.60	360	14.1	66
Guinea	6.30	11.6	0.18	510	9.3	45
Guinea-Bissau	1.00	8.6	0.82	230	8.7	48
Haiti	6.80	45.0	0.66	400	12.0	46
Kiribati	0.10	1.8	2.31	490	0.1	68
Lao (PDR)	4.50	8.6	0.19	305	9.4	49
Lesotho	1.90	12.2	0.64	410	4.7	52
Liberia	2.40	4.5	0.19	510	7.4	33
Madagascar	12.70	34.8	0.27	270	7.1	38
Malawi	9.30	32.8	0.35	225	22.7	28
Maldives	0.20	10.0	4.21	990	9.6	63
Mali	9.20	13.8	0.15	295	5.8	30
Mauritania	2.10	7.6	0.35	465	1.6	39
Mozambique	16.90	62.1	0.37	90	4.6	31
Myanmar	44.70	119.3	0.27	920	8.1	47
Nepal	20.40	72.0	0.35	140	0.9	38
Niger	8.40	10.5	0.12	270	0.7	37
Rwanda	7.50	12.0	0.16	210	3.3	45
Sao Tome & Prin.	0.10	2.4	1.91	330	0.3	58
Sierra Leone	4.50	14.5	0.32	170	1.2	32
Solomon Islands	0.30	5.3	1.53	730	1.6	47
Somalia	8.50	15.0	0.18	115	4.7	38
Sudan	27.30	64.0	0.23	160	16.5	51
Tanzania	26.70	85.0	0.32	105	10.3	26
Togo	4.00	17.3	0.43	325	4.4	41
Tuvalu	0.01	0.2	1.60	1210	1.5	54
Uganda	18.00	20.8	0.12	230	11.8	32
Vanuatu	0.20	4.1	2.53	1170	6.6	67
Western Samoa	0.20	7.1	4.36	915	0.4	41
Yemen, Rep. of	13.40	162.1	1.21	970	43.9	55
Zaire	41.00	36.0	0.09	200	12.7	26
Zambia	8.50	78.0	0.91	400	15.4	34