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**WORLDWIDE PROBE OF THE TELECOMMUNICATIONS DEVELOPMENT GAP  
FROM DEVELOPING COUNTRY AND DEVELOPED COUNTRY PERSPECTIVES:  
THE NATURE OF THE GAP, THE OBSTACLES  
AND THE STRATEGIES TO CLOSE THE GAP**

**A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE  
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REQUIREMENTS FOR THE DEGREE OF**

**DOCTOR OF PHILOSOPHY**

**IN**

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**MAY 1996**

**By**

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## ABSTRACT

A number of conditions indicate that there has not been a satisfactory worldwide advancement of telecommunications infrastructure and service despite increasing enthusiasm for the development of regional information infrastructures or even the global information infrastructure. There is a growing disparity of telecommunications capability between developed countries and developing countries as well as between urban areas and rural areas in developing countries. Few would accept the current conditions of telecommunications in developing countries as they are. What were once problems confined by national boundaries are becoming worldwide in nature. As more countries move toward information-centered economic systems and societies, the advancement of telecommunications capability worldwide becomes more critical.

Given this state of affairs, why do developing countries still lag in infrastructure development? What has prevented developing countries from advancing their telecommunications capabilities? What should be done to remedy the existing unfavorable conditions in developing countries? These are the questions investigated in the study. In order to address these questions, the current study solicited a variety of perspectives of telecommunications professionals from approximately 50 countries by using an iterative international survey.

The study clarified the nature of the telecommunications development gap. The problem of the telecommunications development gap has a quantitative and qualitative nature. The qualitative nature can be further broken into consequence factor and impediment factor. In the study, the impediment factor of the gap was found to be the most critical. These findings point out the need to clarify which of the telecommunications development gap factors should be discussed or examined in a study or in a development



project. In addition, this research indicates that the impediment factor of the gap must not be overlooked in any telecommunications development project.

The study identified a full range of 127 obstacles to efforts advancing telecommunications in developing countries. In addition, the study formed a comprehensive framework of obstacles consisting of 12 categories such as policy and regulation, finance, politics, human resources, etc.. This framework categorizes the gamut of obstacles inherent to telecommunications development in developing countries. Past research had never examined the range of obstacles or provided a comprehensive framework of obstacles to narrow the telecommunications development gap.

Further, the study analyzed each of the 12 categories and identified 23 obstacle factors in seven categories. This means that each of the seven categories is composed of sub-elements or different types of problems. The study analyzed the assessment of developing countries and developed countries about the degree of seriousness of the individual obstacles, obstacle factors and categories of the obstacles. It found both agreement and disagreement between developing countries and developed countries. For example, in the category of human resources development, it was found that developing countries and developed countries were completely consistent in their assessments of the levels of significance of the three obstacle factors. Contrary to this, in the technology category, there were significant differences of assessments of the two obstacle factors. This fact reveals the need for developing countries and developed countries to engage in dialogues that examine the cause and the nature of the different views. Very little had been discovered and understood about how developing countries and developed countries looked at the problem of telecommunications underdevelopment in developing countries.

Finally, the study identified 78 strategies to overcome many of the obstacle factors. It was found that some of the strategies had already been implemented in some countries. Although many of the strategies were narrow and would need to be adjusted on a country-

by-country basis, the study has provided a basis for more extensive elaboration of strategies.

Since each country has different challenges with regard to telecommunications development, it is necessary to identify the inherent obstacles and the unique strategies on a country-by-country basis. Unless telecommunications professionals understand the real mix of problems, they cannot prescribe appropriate solutions that would further telecommunications development. The 12 categories, the 23 obstacle factors and the 78 potential strategies elicited in the present study provide telecommunications professionals with a valuable framework to diagnose the problems inherent to telecommunications development and to prescribe more appropriate actions for improving have and have not conditions.

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**LIST OF ABBREVIATIONS**

<b>DCs</b>	<b>Developed countries</b>
<b>ITU</b>	<b>International Telecommunication Union</b>
<b>LDCs</b>	<b>Developing countries</b>
<b>OECD</b>	<b>Organization for Economic Cooperation and Development</b>

## CHAPTER 1 INTRODUCTION

### 1.1 Information Society and Telecommunications Infrastructure

Over the past several centuries, many societies in the world have transformed from agricultural to industrial based economies. As we approach the close of the 20th century, another transformation is taking place, as societies move from industrial- to information-based economies. Toffler (1990) argued for this trend, demonstrating the decline of industrialism and the rise of a new knowledge-driven economy. He claimed that the underlining force of this movement was information. The role of information in society was highlighted when Machlup (as cited in Hirunrak, 1990) described, in 1962, the growing importance of information in the American economy. Bell (1973) described this economic shift as the move to a postindustrial society. Bell claimed knowledge and information as the central variables of the economy and forecast a new social framework based on information technology and the telecommunications infrastructure (Lyon, 1995, pp. 55-56). Porat (1978) demonstrated that approximately half the U.S. workforce was classified as information workers and that they earned over 50 % of all labor income. He also stated that those who knew the value of information and how to use it would always be more successful (Porat, 1978, p. 79).

Jussawalla argued that the trend toward information-centered society was not unique to the U.S. and was spreading across the world (1986). World wide, the information sector workforce was foreseen to reach 32 percent by the year 2000 ("Technological Innovation," 1986) and it was forecast that the information industry that produces, processes and distributes information would become 40 percent of the world's production by the year 2000 (Dordick & Wang, 1993, p. 2).

The emerging information society and its profound consequences have been extensively discussed (Dizard, 1982; Dordick & Wang, 1993; Masuda, 1980; Toffler,

1990). Geographically dispersed markets, manufacturers, financial institutions and research institutes are being networked. The timely exchange of information is becoming vital. As a result, the significant role of the telecommunications infrastructure as a means of carrying information has drawn greater attention.

A new major policy for establishing the National Information Infrastructure (NII) in the United States, which is regarded analogous to the construction of the national highways in the 1960s, is clear evidence that the United States has recognized the value of information and information flow. The U.S. has been aggressive in enhancing the telecommunications infrastructure as it draws toward the 21st century. The NII is expected to contribute to such social services as telecommuting, education, health care and manufacturing by facilitating information flows. It also aims at enhancing research and promoting access to government information (Hayama, 1994). Similar policies are underway in Asia and in Europe. Today telecommunications is considered central to national interests and has acquired significant strategic importance.

At the International Telecommunication Union (ITU) World Telecommunication Development Conference held in Buenos Aires, Argentina, in March 1994, Vice President Gore of the United States announced his vision of the Global Information Infrastructure (GII) to the world telecommunication community. The GII is aimed at connecting all communities in the world to facilitate communication as well as to share information at the global level (Brillson & Daffner, 1995; "Vice President Gore's GII," 1994). International enthusiasm over the GII concept peaked at the G-7 Ministerial Conference on the Information Society held in Brussels, Belgium, in February 1995. Delegates declared the importance of the GII and discussed a common vision for implementing it. The G-7 countries agreed to conduct international cooperative projects in the following eleven areas:

- 1) global inventory;
- 2) global interoperability of broadband networks;
- 3) cross-cultural training and education;
- 4) electronic libraries;
- 5) electronic museums and

galleries; 6) environment and natural resource management; 7) global emergency management; 8) global healthcare applications; 9) government on-line; 10) global marketplace for small and medium enterprises; and 11) maritime information systems. ("G-7 Ministerial Conference," 1995, p. 2)

## 1.2 Definitions of Key Terms

Before proceeding any further, several terms used in the study should be defined. The study will use the definition of telecommunications used by the Organization for Economic Cooperation and Development (OECD):

Telecommunications includes:

- The production of equipment (switching, transmission, and terminal equipment) which interconnect to provide infrastructure and networks for telecommunications services;
- The infrastructure for the provision of universal telecommunications services on a national and international basis; and,
- The networks and equipment for enhanced telecommunications services (voice, data, video, and facsimile) which are based on the convergence of computer and telecommunications technology and which are forming the basis for a wide range of new industries. (OECD, 1988, p. 9)

As for the scope of the study, although one-way broadcasting is an integral component of the overall telecommunications infrastructure, it will not be examined in the study. Policies, regulations, operation and technologies regarding broadcasting are usually different from those for two-way point-to-point communication technologies. Thus, the study will focus only on issues related to two-way communication technologies.

Through out the study, less developed countries frequently will be referred to as LDCs and developed countries as DCs. The term "less developed countries" will mean



"less economically developed." Many of these countries are well developed culturally and in many other ways. When the results are discussed from Chapter 3 through Chapter 7, LDCs will be referred to as non-OECD countries and DCs as OECD members.

### **1.3 Conditions of Telecommunications in Developing Countries**

While a limited number of countries is moving toward building the GII or regional telecommunications networks, a much larger number of countries, primarily LDCs, is still struggling to elevate the level of telecommunications infrastructure build outs and services to some minimum level. The Missing Link, the report of a study conducted by the Independent Commission for World Wide Telecommunications Development ("The Maitland Commission") for the ITU, revealed that there was an immense gap in access and the extent of telecommunications service offerings between DCs and LDCs. It stated:

...two-thirds of the world population have no access to telephone services....nearly three-quarters of the world's population live in countries with 10 telephones or fewer for every 100 people, and over half the world's population live in countries with less than one telephone for every 100 people. (Independent Commission for Worldwide Telecommunications Development [The Maitland Commission], 1984, pp. 13-15)

Ten years later, the ITU published another report called the World Telecommunication Development Report that was prepared for the 1994 World Telecommunication Development Conference. Part of the report covers the progress of telecommunications development in LDCs over the last decade. The report shows that overall growth in the telecommunications infrastructure, which was around five percent per year, exceeded the growth of the worldwide real Gross Domestic Product (GDP), which was between 1 and 4 %, from 1983 to 1992 (ITU, 1994a, p. 2). It also shows that telecommunications service revenues as a percentage of GDP increased gradually in

selected Asian countries and increased from around 1.5 % to 2 % to 5 % in selected African countries during the same time period (ITU, 1994a, p. 4).

Even though these statistics show the bright side of telecommunications development in some of the LDCs, there is a consensus that the missing link is still "missing." The Pacific Telecommunications Conference in 1994 (PTC'94) addressed the status of telecommunications development in LDCs. At the conference, the Secretary-General of the ITU stated:

At the end of 1992, almost 50 countries accounting for over half the world's population had a teledensity of less than 1....As long as half the world's population suffers from low levels of telecommunications development, the vision of a global electronic village remains a dream. (Tarjanne, 1994, p. 9)

It is hard to imagine that 1,000 users have to share fewer than 10 telephone sets. This is, however, exactly the condition in some of the LDCs.

The Undersecretary of the Department of Transportation and Communications in the Philippines stated that the major problems still remained, such as access to telephone service, large unmet demand, unbalanced urban-rural distribution and poor quality of service (Lichauco, 1994). In recalling the progress achieved during the last decade, Sir Donald Maitland (1994), who served as chair of the Maitland Commission, also concluded that the global picture of telecommunications development was not necessarily encouraging.

Several statistics show a huge imbalance of telecommunications development between DCs and LDCs. In 1993, 71% of the countries in the world were LDCs; these countries held 77% of the world population; these people were provided with only 18% of the telephones in the world ("World Telecom," p. 13). In 1991, the United States and Canada combined had an installation base of 146 million telephones. Japan had 56 million telephones while the rest of Asia combined had almost 56 million. The total installation

base of all African countries was only 9 million telephones ("World Telecom," p. 21). The total number of telephone main lines in about 50 of the least developed countries is just over one percent of the total number of lines in the United States alone (Kelly, 1995, P. 3). The concentration of telephones is found not only in DCs but also in urban areas in LDCs. For example, in low income countries of which the Gross Domestic Product (GDP) per capita is less than US\$635, 28% of the main lines are concentrated in the largest city where only 4% of population lives (ITU, 1994a, p. 78).

All these conditions indicate that there has not been a satisfactory overall advancement of telecommunications infrastructure and service despite enthusiasm during the last decade for the development of regional information infrastructures or even the global information infrastructure. There is a growing disparity of telecommunications capability between DCs and LDCs as well as between urban areas and rural areas in LDCs.

#### **1.4 Consequences of Telecommunications Underdevelopment**

Related to his assertion of the rise of the new knowledge-driven economy, Toffler (1990) discusses some negative economic impacts of its arrival on LDCs. He identifies three distinct groupings among LDCs:

One consists of desperately poor countries still mostly dependent on First Wave peasant labor. Another group includes countries such as Brazil, India, and China. These countries are actually important Second Wave or industrial powers, but saddled with vast populations still scabbling for subsistence from preindustrial agriculture. Lastly, there are nations such as Singapore, Taiwan, and South Korea, which have virtually completed industrialization and are moving swiftly into Third Wave high technology. (pp. 383-384)

He explains that once advanced countries such as Europe, Japan, and the United States developed highly value-added products by effectively utilizing computers and

telecommunications they transferred many of the less information-oriented tasks to certain less developed countries. This resulted in the speedy industrialization of such countries as South Korea, Taiwan and Singapore. These countries then passed off those tasks to more economically backward countries while they made the transition to more information-intensive economies (p. 387). Many LDCs, however, have not made the transition from less information-intensive economies to information-intensive economies, and as a result, they lag behind the rest of the world in overall national development. Lee (1995) finds that while more than three-quarters of the DCs invest in the modernization of their wired networks and in the extension of wireless networks, many of the LDCs spend almost two-thirds of their investment on constructing basic wired networks (p. 2).

Toffler sees a growing disparity of the world into two groups:

.... from now on the world will be split between the fast and the slow. .... In fast economies, advanced technology speeds production. .... Their pace is determined by the speed of transactions, the time needed to take decisions (especially about investment), the speed with which new ideas are created in laboratories, the rate at which they are brought to market, the velocity of capital flows, and above all the speed with which data, information, and knowledge pulse through the economic system. Fast economies generate wealth - and power - faster than slower ones. (1990, p. 389)

Information and knowledge, key factors of the new economic system, have suppressed the values of the three key factors of production of the agrarian and manufacturing economic systems: labor, capital and land. Thus, many of the LDCs still heavily dependent on labor-intensive agrarian manufacturing economies are at a considerable disadvantage concerning their economic capability in the world. The dramatic economic growth, supported by the shift toward information-oriented economies in Newly Industrialized Economies (NIEs) such as South Korea, Singapore, Hong Kong and Taiwan, is the result of their awareness

of the superior power of the new economic system as well as their coordinated efforts to catch up with the most advanced economies (Choi, 1992; Kim, Kim, & Yoon, 1992; Kuo, 1993; Kyong, 1995; Naya, 1988; Parapak, 1994; Ure, 1993, 1995a).

The new system for generating wealth depends on an instant communications network through which data, information and knowledge flow. An adequate telecommunications infrastructure and services are essential for any nation to play an important role in the world economy. Those LDCs that do not have adequate telecommunications are in danger of being economically exploited by the rest of the world.

The fast and slow could be exemplified in the level of teledensity (telephone lines per 100 inhabitants). While the least developed countries have increased their level of teledensity from 0.19 to 0.29, a 150% increase, those LDCs which are slightly more developed, for example China, India, Egypt and Pakistan, have increased teledensity from 0.31 to 1.21, a 400% increase, over the last decade (Kelly, 1995, p. 3).

Underdevelopment in telecommunications in LDCs and the resulting information imbalance also intensify social divisions in the world. Hamelink (1995) indicates that most of the world's information moves among DCs and information between DCs and LDCs tends to move one-way from the former to the latter (p. 298). A hundred times more news, mostly about DCs, flow from DCs to LDCs; information about natural resources in LDCs is collected by satellites of DCs; DCs' sophisticated military surveillance networks cover LDCs. This situation is attributed to the LDCs' inability to produce, distribute, and access relevant information (Hamelink, 1995, pp. 298-301). He points out four disadvantages of LDCs caused by the information imbalance: inadequate information capacities hinder LDCs' efforts to overcome poverty, malnutrition, poor health and other problems; LDCs are continuously at a disadvantage in international negotiations with DCs; the national sovereignty of LDCs is threatened by DCs that own much information about LDCs; the

preservation of cultural heritage and cultural self-determinism in LDCs are undermined by the huge inflow of cultural information from DCs (pp. 304-305).

Given these negative consequences, few would accept the current conditions of telecommunications in LDCs as they are. Casmir (1991) states that the reality of a border, which stems from the state concept, disappears because of worldwide information flow (p. 24). As these borders disappear, what were once problems confined by national boundaries become worldwide in nature. As more countries move toward information-centered economic systems and societies, the advancement of telecommunications capability worldwide becomes more critical.

Given this state of affairs, why do LDCs still lag in infrastructural development? What has prevented LDCs from advancing their telecommunications capabilities? What should be done to remedy the existing unfavorable conditions in LDCs? These are the questions that will be investigated in the study.

The following chapters are organized as follows. Chapter 2 reviews selected literature on the benefits of a telecommunications infrastructure, the nature of the telecommunications development gap, obstacles to telecommunications development and strategies for overcoming the obstacles. Three research questions are elaborated and more explicitly stated in the chapter. Chapter 3 discusses an international survey as the study's research methodology. Chapter 4 summarizes the results of the survey and Chapter 5 presents a discussion of the results. Chapter 6 discusses the contributions of the study and Chapter 7 points out its implications.

## CHAPTER 2 LITERATURE REVIEW

### 2.1 Benefits of Telecommunications

It has been well documented that world-wide there is a high correlation between the level of telecommunications infrastructure represented by the number of main telephone lines per 100 inhabitants and the level of economic power represented by the national per capita Gross Domestic Product (GDP) (Saunders, Warford, & Wellenius, 1994). This strong correlation was first pointed out by Jipp in 1963 (as cited in Gille, 1986). Since then, many studies have examined the contributions of telecommunications to economy and society. Those studies consist of macro-level and micro-level studies.

Investigating the macro-level economic benefits of telecommunications, Hardy (1980) found a causal relationship between the telecommunications infrastructure and the national economy in over 60 nations. He showed that the number of telephones per million people at time  $t-1$  was a significant predictor of GDP at time  $t$ . Cronin, Parker, Colleran, and Gold (1991) statistically confirmed that the two variables representing overall US economic activity, the sum of the output of all industries and the annual Gross National Product, were causally associated with the annual amount of US telecommunications investment. Cronin, Colleran, Herber, and Lewitzky (1993) further showed that telecommunications investment was a reliable predictor of national productivity in the United States.

Another study in the United States conducted by Dholakia and Harlam (1994) looked at the influence of independent variables, such as the development level of telecommunication (i.e., number of business access lines per employee), education expenditure, rural highway miles and energy consumption, on economic development measured by the two dependent variables average annual pay and per capita income. They found that telecommunication was an important predictor of the two dependent variables when it was treated as a single independent variable. Even when telecommunication was

combined with the other independent variables, its effect on the dependent variables was higher than the others in all but one case (pp. 474-475).

Looking at telecommunications and the French and Spanish economies, Berry (1983) concluded that telecommunications development must proceed economic development and argued that the ultimate cost of underestimating the significance of the telecommunications infrastructure would be quite high. Jussawalla (1988) supported the above claim by saying "As long as telecommunication promotes resource mobilization through improved division of labor, it becomes an agent of development" (p. 19). She argues that in most economies, investment in information-oriented industries would give rise to overall demand in other sectors (p. 39).

Saunders (1982) discussed the benefits of telecommunications in terms of financial and economic returns. He showed that the World Bank's telecommunications investment projects brought an average financial rate of return of 18 percent and economic rate of returns ranging from 20 percent to 50 percent (p. 191).

Clarke and Laufenberg (1983) showed that telecommunications brought a variety of social benefits in addition to economic benefits in rural Sub-Sahara Africa. Social benefits were identified in health and social service delivery, education, development projects, the stabilization of migrants and the handling of natural and social disasters. Hudson (1984, 1989) also presented a number of social as well as economic benefits of telecommunications in rural areas, both in LDCs and DCs. Melody (1993) states "Just as the major cities in all countries are being drawn into the global economy by enhanced telecommunications services, so rural and remote areas can be drawn more directly into national and global economies" (p. 18). Lesser and Osberg (1983) found that telecommunications accrued to more effective security services, easier social interaction, expanded market areas, the improved use of relatively scarce labor groups, improved planning and energy savings. They also suggested that the full benefit of any kind of



infrastructure would require adequate levels of other infrastructures, including telecommunications (p. 33).

Focusing on the micro-level benefits of telecommunications, Kaul (1983) conducted a case study in India. The study showed that people in rural areas would use telephones. If telephones were available, they would be prepared to pay for important long-distance calls. In examining the substitutability of telephone service, he compared the cost of travel to convey a message with the cost of a telephone call to send the same message. He presented the resulting substituted cost, which was called consumer surplus, as an economic benefit of telecommunications to users. Jussawalla and Ogden (1989) showed that the business consumer surplus in Fiji, Papua New Guinea (PNG) and the Federated States of Micronesia (FSM) was US\$180, US\$340 and US\$375 respectively (p. 45). They also measured the social benefits in agriculture, education, health and disaster preparedness attributed to telecommunications investment in terms of social benefit/cost ratios and found that the ratio was 2.2 in FSM, 3.7 in Fiji and 27.6 in PNG (pp. 44-45). Kamal (1983) investigated the substitutability of telephone service in a sample of 146 villages in Egypt. While his findings were similar to those of Kaul's, he found that the number of users connected to the telephone network affected the level of benefits realized by the users (p. 49).

In addition to a number of studies using a range of approaches range from macro-level to micro-level, telecommunications practitioners agree that an adequate telecommunications infrastructure is key for a nation's development. The Maitland Commission (1984) wrote:

The link between telecommunications development and economic development is also obvious today in a developed country such as Australia, where capital expenditure on development of telecommunications infrastructure can create employment

opportunity,...through significant industry flow-on effect in traditional and high technologies. (p. 75)

Telecommunications is also recognized as providing a major supporting role to the social and economic development of Western Samoa. It must also eventually evolve to become a catalyst to social and economic development. A reliable and cost effective telecommunications system can help to support other infrastructure development projects in the rural areas of the country such as roads, power, and water, to improve public services such as health and education, and to speed up agricultural production and marketing, information flow and business transactions. (p. 76)

A major portion of the labor force in these (developing) countries is still in the agricultural sector. Following the pattern of economic development in the industrial countries, the labor force will have to increasingly move into non-agricultural sectors. Technology, and very importantly, telecommunications technology has played and will play an important role in this shift of labor, and hence, in the pace and level of economic development. (p. 77)

These statements, made in 1984, address the economic and social benefits of telecommunications. The fact that these statements still remain true indicates the continuing critical role of telecommunications. Peirce and Je'quier (1983) suggest that we view the telecommunications infrastructure not simply as one infrastructure among others but as the neural system of a society.

## **2.2 Nature of the Telecommunications Development Gap**

The first research question in the study is: "What is the nature of the telecommunication development gap?" Much effort has been expended to promote telecommunications development in LDCs through various types of development projects initiated by LDCs and/or DCs. Some efforts are effective, but others are not. Breiner (1992) states "It is therefore disappointing to find that many telecommunications projects have in the past frequently fallen short of their objectives" (p. 445). Jamieson (1991) analyses the lack of success as follows:

Change is being promoted in the name of development without any possible certainty as to its ultimate social and environmental outcomes. ....The combined and sometimes interactive effects of multiple projects in a region or a sector, probably undertaken independently, may come as a complete surprise. This is why many development programs fall far short of the original expectations and some even do more harm than good. (p. 31)

One probable cause of the failure is presented by Uphoff (1985) as " .... too much effort goes into trying to find out what is wrong with the people who don't adopt the technology and too little effort goes into finding out what is wrong with the technology ...." (p. 38). These analyses illustrate that development efforts with incorrect assumptions about the problem and without clear goals cannot hope to achieve desirable outcomes. The same hold true in telecommunications development. What is needed first is to examine the problems that many LDCs have faced and identify the critical dimensions of these problems. As long as new development projects are initiated without understanding the critical dimensions of these problems, not much improvement can be expected from these projects.

The current study aims at examining problems of telecommunications development in LDCs and identifying the critical dimensions. The first step is to thoroughly investigate what the term telecommunication development gap means.

Several descriptors are used to depict the status of telecommunications development in LDCs. Some examples are missing link, disparity, imbalance and gap. The word gap will be used in the study as a composite of what each of these words represents.

The Maitland Commission (1984) described the gap as unbalanced distribution of telephones across the world, low teledensity, shortage of exchange capacity, length of the waiting period for acquiring a telephone line, low quality service and imbalance of telecommunications infrastructure between urban and rural areas. The ITU (1994a) uses national teledensity, the relationship between a country's population and the number of main telephone lines, the distribution of telephone lines within a country and poor quality of service. The Secretary-General of the ITU stated that the gap existed not only in quantitative terms but also in qualitative terms (Tarjanne, 1994, p. 9).

As the above examples show, dimensions of telecommunications problems depicted by the term gap vary extensively. When the term gap is used in the literature or orally to reflect the problems of telecommunications development in LDCs, only a few of the dimensions of the problems are examined at a time. In order to fully understand the core of the problems inherent in telecommunications development in LDCs, it will be necessary in the study to comprehend the telecommunications development gap as a whole. Although the word gap is frequently used to refer to the underdevelopment of telecommunications in LDCs, there has been no study that has analyzed comprehensively the nature of the underdevelopment. The current study will aim at forming a framework to fully grasp the nature of the gap by identifying the dimensions of the gap. Thus, the first research question in the study is stated as "what is the nature of the telecommunication development gap?"

### **2.3 Obstacles to Telecommunications Development**

While many studies have addressed the probable obstacles to telecommunications development in LDCs, they discuss only some of the existing obstacles. In addition, the focus of these studies is on LDCs. As a result, most obstacles have been attributed to LDCs alone. The second research question of the study, then, will concern all existing obstacles found in both LDCs and DCs.

The Maitland Commission (1984) analyzed several obstacles to closing the telecommunications development gap. They are summarized as follows:

#### **1. Funding:**

- \* LDCs need more capital than they can raise themselves; and,
- \* Hard currency necessary for purchasing telecommunications equipment abroad is scarce.

#### **2. Priority of telecommunications:**

- \* Other sectors such as agriculture, health, education and roads get a higher priority in national budgets than telecommunications due to the lack of understanding of the catalytic role of telecommunications in development.

#### **3. Imported equipment:**

- \* The design of imported equipment is less suited to the environments and needs of LDCs;
- \* Manufacturers abroad stop producing old systems that are still widely used in LDCs, and as a result, LDCs are forced to replace their equipment; and,
- \* Different types of equipment installed over a number of years lead to difficulties in training, compatibility and maintenance.

#### 4. Service in remote areas:

- \* Various geographical barriers to remote areas as well as lower monetary returns from those areas reduce the incentives to extend telecommunications services to those areas.

These obstacles concern economic, political, technological and geographical issues.

Wellenius (1989) argued that LDCs had three obstacles to overcome. The first is the scarcity of foreign exchange, a financial obstacle. The second is the operating entities' lack of internal organization and management. And the third is insufficient autonomy of the operating entity from government. The latter two obstacles are related to organizational and policy issues.

The Secretary-General of the South Pacific Forum Secretariat expressed his concern that governments in many LDCs had been dependent on the telecommunications sector's cash flow for use in other sectors. He also stated that capital investment in telecommunications was often linked to the next available aid package (Tabai, 1994, p. 43). These problems are political obstacles to development of the telecommunications sector. Parker (1992) identified another political obstacle. He pointed out that power holders in government tended to oppose development of telecommunications fearing that the development would weaken their position. He argued that existing economic and political power holders needed to be persuaded that the development of telecommunications could be a "win-win" proposition.

In the World Telecommunication Development Report, the ITU discussed some of the most common obstacles to telecommunications development (1994a, p. 79) :

##### 1. Lack of re-investment:

- \* Whereas rapid telecommunications development was achieved in countries where at least 50 per cent of telecommunications revenues were reinvested, the level of reinvestment is still low in many other LDCs.

**2. Poor quality of service:**

- \* Outdated equipment and inadequate maintenance result in poor quality of service, leading to loss of revenues.

**3. Foreign exchange scarcity:**

- \* Hard currency is limited due to high external debt and limited export earnings; and,
- \* Foreign exchange through the international accounting rate system tends to be transferred to the central bank instead of being directly used for telecommunications development.

**4. Investment inefficiencies:**

- \* In many LDCs, the cost of installing one telephone line is far beyond the widely used figure of around US \$1,500;
- \* Higher installation cost per line in rural areas hinders the extension of the network to those areas; and,
- \* Such promising low cost technologies as cellular radio and VSAT (Very Small Aperture Terminal) suitable for rural areas tend to be provided primarily to urban areas.

**5. Absence of universal access policy:**

- \* Many LDCs lack a universal access policy.

**6. Inadequate private sector involvement:**

- \* Private sector involvement has not yet been adopted by many LDCs.

**7. Insufficient regional cooperation:**

- \* Cooperation for regional links, pooled equipment purchases, shared training and technical specifications on equipment has rarely been fully developed.

#### 8. Organizational limitations:

- \* Because telecommunications services are provided by monopoly, government-run organizations in most LDCs, there are few incentives for better performance; and,
- \* It is difficult to retain qualified staff due to low salaries.

The number of identified constraints in the report is greater than that in the Maitland Commission report. These constraints are financial, technological, managerial, economic, geographical, policy, and organizational in nature.

Regarding managerial constraints, Kyong (1995) claimed that "Experts in such fields as management, consulting, legal issues on technology, finance and policy in relation to information and communications are also in short supply" (p. 3). Moran (1994) stated that telecommunications administrations in LDCs are having difficulties making telephone service available to every one in the country, keeping abreast in digital technology and keeping up with an ever changing environment (p. 26). These problems come from the insufficient planning capabilities of the operator and the government. Kirunda-Kivenjinja (1995) pointed to obstacles such as inappropriate organizational and managerial ability, the loss of trained staff, the necessity to adapt training materials to advanced technologies, and the difficulty of keeping up with technology (pp. 1-2). He showed that there are organizational, managerial, human-resource and technology related obstacles in LDCs.

One of the key trends in the telecommunications sector during the past decade is the shift of control, i.e., deregulation, liberalization and privatization of telecommunications entities worldwide. This trend was triggered by the divestiture of AT&T in the United States and the privatization movement in the United Kingdom in the early 1980s. Regardless of this prevailing trend and the notorious structural problems of government-operated telecommunications entities, many LDCs have not yet changed how they provide telecommunications services. The former Deputy Director General of India's Department



of Telecommunications stated, "Most of these reforms are opposed by the government departments providing telecommunication services in many LDCs, ...." (Chowdary, 1992, p. 593). Such resistance to change can be an organizational hindrance to telecommunications development in LDCs. In addition, Pisciotta (1994) states that significant resistance to reform comes from national security concerns (p. 29). This is a political obstacle to reform.

Saunders (1982) presented the following constraints to telecommunications growth in LDCs, addressing organizational, political and policy obstacles (pp. 195-200):

1. Inadequate efforts by telecommunications entities to achieve a higher national priority for the telecommunications sector;
2. Lack of understanding among planning and finance ministers of the significant importance of telecommunications;
3. Telecommunications pricing and investment policy not analyzed together with national investment policies;
4. Incorrect perception that rural public telephone service is unprofitable; and,
5. Insufficient financial and management autonomy of the operating entities.

While all the above obstacles exist in LDCs, Hudson (1983) presented one obstacle attributed to DCs. She pointed out that international development institutions charged with assisting LDCs had not well understood the role of telecommunications for LDCs. She argued that those institutions were inclined to regard telecommunications as an urban luxury and their loan requirements tended to ignore services in rural areas (p. 293).

The preceding discussion leads to two conclusions regarding the existing literature about obstacles to telecommunications development. First, there has not been a comprehensive examination of the problem. Secondly, unequal attention has been focused on LDCs and DCs in discussions of obstacles to telecommunications development in LDCs.

As to the first point, while the literature review above has made it clear that a variety of obstacles exist, it has also revealed that each study discussed only a few of all the existing problems. No study attempted to comprehensively examine the whole gamut of the obstacles. Furthermore, it is not clear whether certain obstacles have a relatively greater negative impact on the development of telecommunications than others. Few studies have examined the relative negative impact of each obstacle. Therefore, it is necessary to comprehensively investigate the full range of the possible obstacles and their relative impacts.

Regarding the unequal attention toward LDCs and DCs, many studies have argued that the LDCs possess many constraints that can only be overcome by the LDCs themselves. Not much attention, however, has been paid to the possibility that the DCs might be responsible for some of the constraints to telecommunications development in LDCs. This question will be addressed in the current study. Thus, the second research question of the study will concern the fullest range of the existing obstacles found in both LDCs and DCs.

So far the characteristics of the obstacles identified above are policy, economic, financial, managerial, organizational, technological, political and geographical. Bernt and Weiss (1993) group international telecommunications issues into four categories: regulatory, organizational, economic, and technical. Regulatory issues include monopoly versus competition, deregulation, privatization and tariff structures; organizational issues concern operating entities and international/regional telecommunications-related organizations; economic issues include accounting rates, pricing and standards; technical issues concern telecommunications technologies. Since the characteristics of the previously identified obstacles fall into these four categories of international telecommunications issues, the four categories will be used as a basic framework to examining the whole gamut of possible obstacles.

## **2.4 Strategies to Overcoming the Obstacles**

Equally important to an analysis of the obstacles to telecommunications development is an analysis of strategies to overcome them.

Much research has been carried out to study the "current status" or the "recent progress" of the telecommunications sector in selected LDCs. Hukill and Jussawalla (1991) examined the current condition of telecommunications in ASEAN (Association of Southeast Asian Nations) countries. Jussawalla (1992) surveyed the progress of telecommunications development over the past decade in a number of countries in Asia, the Pacific, Latin America, Arab and Africa. Ogden (1995) examined some of the global telecommunications trends in the context of Pacific Island developing countries. Ure (1995a, 1995b) researched recent telecommunications development in such Asian countries as Brunei, Burma, Cambodia, China, Hong Kong, Indonesia, Laos, Malaysia, the Philippines, Singapore, South Korea, Taiwan, Thailand and Vietnam. These studies were very informative in presenting the historical development and the current standing of telecommunications in selected LDCs. They do not, however, indicate what strategies were used to overcome certain obstacles.

This does not mean that few studies have proposed strategies. In fact, many studies have identified or suggested a variety of strategies to advance telecommunications in LDCs.

Regarding policy and regulation related strategies, Ras-Work (1995) advocated the BOT (Build Operate Transfer) scheme as an alternative to privatization of the government operator in LDCs. Kelly (1995) regarded the new licensing policy for cellular operators and international gateways in the Philippines as the primary factor that brought the dramatic increase of main lines in 1993 (p. 4). Gatica (1994) attributed the growth of the telecommunications sector in Chile to a new legal framework adopted by the government (p. 35). In order to promote investment from the private sector and alleviate risks born by private operators, Sekizawa suggested policies such as the establishment of an independent

regulatory body, securing fair interconnection among operators and securing a minimum return for private operators (1995, p.4). In Tanzania, Kiula (1994) suggested that "sector restructuring and commercialization should first be implemented and privatization should be introduced where feasible" (p. 37).

Regarding the reform of policy and regulation, Harrington (1995) surveyed a number of telecommunications reforms taking place in the Asia Pacific region and argued that the restructuring of the telecommunications sector in LDCs should be a way to attract capital to promote the growth of telecommunications. While admitting the importance of restructuring the telecommunications sector, Ure added that reform should proceed with a clear vision of national economic development (1993, P. 5).

As to technology related strategies, Harrington discussed the advantages of a wireless access network (1995, p. 5). Cutler (1994) also advocated the use of wireless technologies in the local loop (p. 6). Kiula (1994) warned that LDCs should avoid use of obsolete technologies and non-standardized equipment from DCs (p. 37). Regarding local manufacturing, Olanrewaju (1995) argued that local manufacturing capability would ensure rapid development of telecommunications services in LDCs.

Again, the link between obstacles and strategies was never explicitly examined in these studies. These studies proposed strategies without clarifying the targeted obstacles. Also, each study focused on parts of the whole problem related to telecommunications underdevelopment and suggested strategies for a limited facet of the problem. In addition, not many studies suggested strategies to be taken by DCs. This is consistent with the fact many studies have attributed obstacles only to LDCs. No research has been done to investigate globally what strategies LDCs and DCs have been taking and should take to resolve many of the obstacles to telecommunications development. Thus, the third research question of the study is stated as "what strategies should we take to close the gap."

In summary, the literature review in this chapter indicates that there have been few studies that comprehensively examine the nature of the telecommunications development gap. Few studies have critically investigated obstacles of the gap and various strategies to narrowing the gap. The current study is aimed at answering these three questions, and as a result, expects to contribute to knowledge about telecommunications development in LDCs.

## CHAPTER 3 RESEARCH METHODOLOGY

To investigate the issue of the telecommunications development gap, the perspectives of telecommunications practitioners worldwide were solicited by using an iterative three-round international survey. Questionnaires were used because it was necessary to get sequenced opinions of people who were geographically dispersed throughout the world. The iterative three-round survey was designed to address the three research questions sequentially. The first-round questionnaire examined the dimensions of the telecommunications development gap and identified conceivable obstacles both in LDCs and DCs. The second-round questionnaire included information regarding the obstacles derived from the first-round survey, assessed the level of negative impact of each obstacle, and explored current and future strategies to overcome some of the very critical obstacles. The third-round questionnaire incorporated the results of the obstacle assessment and the strategies identified in the second-round survey, and then elaborated further upon those strategies.

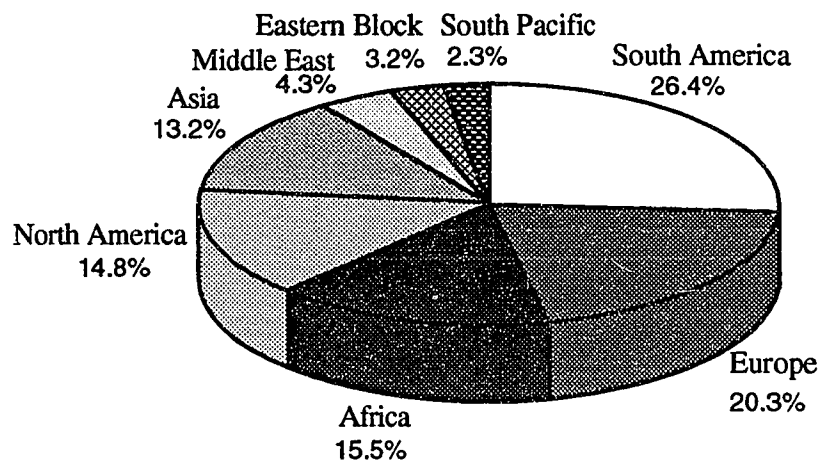
### 3.1 Survey Participants

The survey participants in the study were national delegates and representatives of international and regional organizations and agencies to the ITU World Telecommunication Development Conference held in Buenos Aires, Argentina, in March 1994. The purposes of the conference were:

1. to review the progress made in telecommunication development in the last decade;
2. to set goals and objectives and to define and establish a common vision and strategies for achieving balanced telecommunication development by and beyond the end of the century; and,

3. to develop an action plan translating the goals and objectives agreed upon into concrete work programs to be implemented over the next four years. (ITU, 1994b, p. 1)

A list of the delegates was obtained from the Pacific Telecommunications Council in Hawaii directly upon the conclusion of the conference. The regional distribution of the 752 delegates in the list is shown in Figure 3.1. Most of the delegates, except for those coming from international and regional organizations, were government officials and telecommunications professionals in the private sector.



**Figure 3.1.** Regional distribution of the delegates to the ITU World Telecommunication Development Conference.

While approximately 960 delegates attended the conference, the present study used the officially listed 752 delegates as the source for possible participants in the survey. It was noted that some countries sent 10, 20 or 30 delegates and others sent fewer (i.e., 2-9) delegates to the conference. In order to avoid an over-representation of any country in the survey, around ten delegates were selected from those countries which had more than ten delegates and most or all of the delegates were selected from those countries which had fewer representatives (i.e., 2-9). As a result, the present study selected 410 participants as

a representative sample of all the participants. In narrowing down the number of survey participants, it was ensured that the selected delegates' affiliations would represent a balance between the public and private sectors.

### **3.2 Iterative International Survey**

A three-round international survey was administered by developing a different questionnaire for each round. The first-round questionnaire was designed to investigate the nature of the telecommunications development gap and to identify existing obstacles that had prevented the gap from being narrowed. When the questionnaire was prepared, it was filled out by 20 participants in a pilot test to see if the questionnaire would be clearly understood by survey participants. A final first-round questionnaire was prepared based on the results of the pilot test and sent out by either air mail or facsimile to the remaining 390 participants.

The second-round questionnaire aimed at measuring the criticality of each of the obstacles identified in the first-round questionnaire and soliciting current and future strategies to overcome some of the most critical obstacles. A draft of the questionnaire was examined by five people to find out if there were any flaws. A final second-round questionnaire was prepared based on the results of the pilot test and sent out by air mail to 405 participants.

The third-round questionnaire was designed to elaborate further the strategies identified in the second-round questionnaire. Since the questionnaire was very simple, no pilot test was conducted. Since the objective of the third-round survey was to refine the answers in the second-round survey, the questionnaire was sent out by either air mail or facsimile to the 93 participants who had replied to the second-round survey.

The research design used in the study is summarized in Figure 3.2.



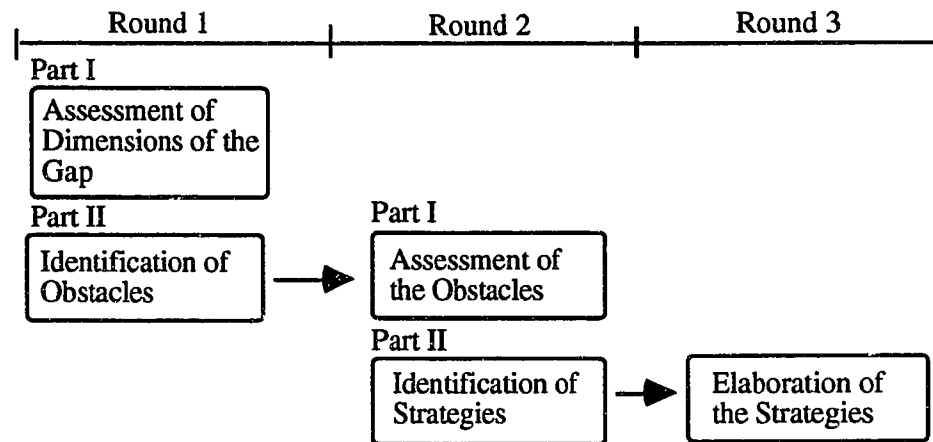


Figure 3.2. Iterative survey design.

### 3.2.1 First-round Survey

#### 3.2.1.1 Pilot test

Twenty (20) people worldwide were randomly selected from a pool of 410 participants. The researcher received a supporting letter for the study from Pekka Tarjanne, Secretary-General of the ITU, with the cooperation of the Pacific Telecommunications Council in Hawaii (see Appendix A). A draft of the first-round questionnaire with the supporting letter was sent out to them by facsimile.

It was not mentioned in the invitation letter that they were participating in a pilot test. Nine participants responded to the questionnaire. The distribution of the twenty people and nine respondents are as shown in Table 3.1.

Table 3.1

Countries of the Participants in the Pilot Test for the First-round Survey

Country	Sent	Responded
Canada	1	0
Czech Republic	1	0
Chile	1	1
England	1	1
Fiji	1	0
Germany	1	1
India	1	0
Japan	3	3
Kenya	1	1
Korea	1	0
Oman	1	0
Papua New Guinea	1	0
Philippines	1	1
Singapore	1	0
Spain	1	0
Thailand	1	0
Tuvalu	1	0
Western Samoa	1	1
Total	20	9

**3.2.1.2 Questionnaire**

The first-round questionnaire consisted of Parts I and II (see Appendix B). The results of the pilot test indicated that the respondents fully understood Part I of the questionnaire that had to do with the nature of the telecommunications development gap. In Part I, twelve dimensions of the telecommunications development gap were presented in a diagram as shown Figure 3.3. These dimensions were derived from prior research, as discussed in section 2.2 in Chapter 2, and then integrated into the diagram by the researcher. The respondents were given the opportunity to add other dimensions if they felt the original 12 dimensions comprised an incomplete list.

The survey participants were asked to review the given dimensions and to list other dimensions, if any. The participants were asked to rate, using a scale from 1 (not important/critical) to 7 (very important/critical), how important/critical each dimension was in the problems of telecommunications development in LDCs.

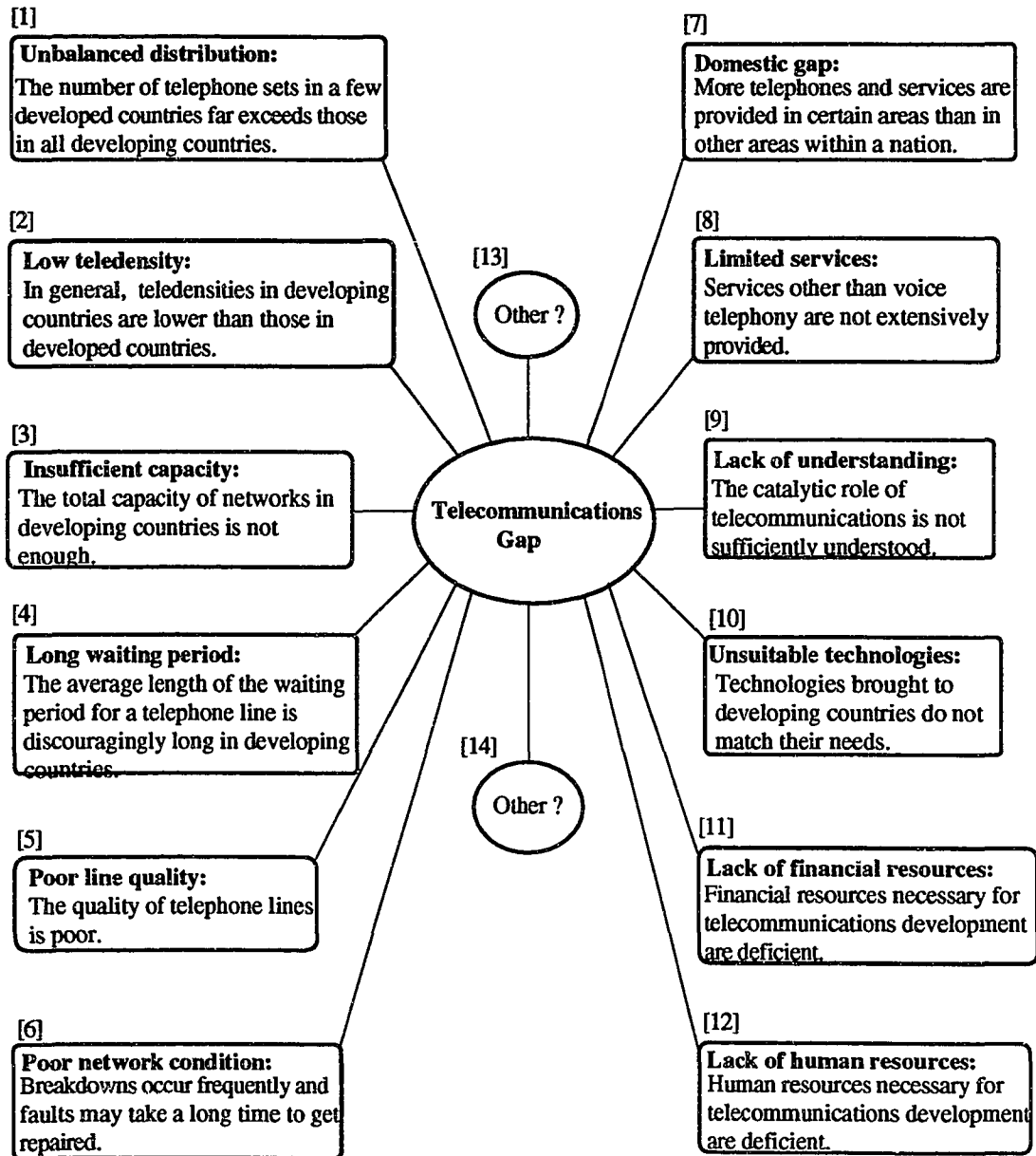


Figure 3.3. Dimensions of the telecommunications development gap.

Part II of the questionnaire was designed to identify existing obstacles that had prevented the telecommunications development gap from being narrowed. The survey participants were asked to identify one or two obstacles that they believed had most hindered telecommunications development in LDCs. To help them organize their responses systematically, a certain framework was provided in the questionnaire.

Bernt and Weiss (1993) group international telecommunications issues into four categories: regulatory, economic, organizational and technical. The present study used this classification as a basis to draw up a framework to identify all the possible obstacles. When we examine any kind of development problem, we cannot exclude human elements of it. In investigating problems of telecommunications development, knowledge and human resources are human-related issues. Thus, these two categories were added to the original four category framework, resulting in the following six category framework: 1) policy and regulation-oriented; 2) organization and administration-oriented; 3) finance-oriented; 4) technology-oriented; 5) knowledge-oriented; 6) human resources-oriented; and others. The category "others" was included to allow participants to add further categories.

The results of the pilot test indicated that some answers did not fit well into any of the provided six categories. Based on this finding, two new categories were added in a final questionnaire. They were politics-oriented and economy-oriented (see Figure 3.4).

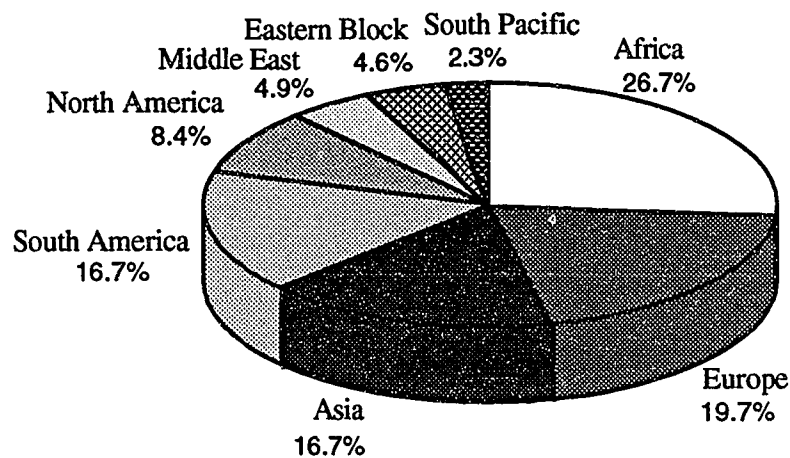
The participants were asked to place each obstacle in one of the eight categories. They were also asked to mark to which entity the identified obstacles were attributed: 1) LDCs; 2) DCs; 3) international/regional telecommunications organizations; or 4) international/regional funding/aid agencies (see Figure 3.4). The questionnaire also solicited participants' affiliations and demographic information.

Descriptive Category	
A: Types of obstacles	B: Origin of the obstacles
(1) <b>Policy and Regulation-oriented</b> obstacles	(1) <b>Developing</b> countries
(2) <b>Organization and Administration-oriented</b>	(2) <b>Developed</b> countries
(3) <b>Finance-oriented</b> obstacles	(3) International and/or Regional <b>Telecommunications</b> organizations
(4) <b>Technology-oriented</b> obstacles	(4) International and/or Regional <b>Funding/Aid</b> organizations
(5) <b>Knowledge-oriented</b> obstacles	(5) Other 1 ( )
(6) <b>Human resources-oriented</b> obstacles	(6) Other 2 ( )
(7) <b>Politics-oriented</b> obstacles	
(8) <b>Economy-oriented</b> obstacles	
(9) Other 1 ( )	
(10) Other 2 ( )	

**Figure 3.4.** Framework to identify obstacles in the first-round survey

### 3.2.1.3 Implementation

Since 20 out of 410 participants had been involved in the pilot test, the remaining 390 participants were involved in the actual first-round survey. The regional distribution of the delegates is shown in Figure 3.5. A package containing an invitation letter from the researcher, the supporting letter from the Secretary-General of the ITU, the first-round questionnaire and a self-addressed return envelope was sent out to 193 participants in those countries where postal services were regarded as reliable. Postage for the return mail was not enclosed because there was no means of purchasing the appropriate foreign stamps in the U.S.. To the remaining 197 participants, the same package, excluding self-addressed return envelope, was sent by facsimile. The list of countries is attached as Appendix C. All participants were asked to return a completed questionnaire by facsimile, if possible, or by air mail.



**Figure 3.5.** Regional distribution of the 390 delegates in the first-round survey.

Three weeks after the first-round questionnaire was sent out, a brief reminding letter was sent by facsimile to those participants who had not yet responded to the survey. Several participants responded to the researcher saying that they had somehow not yet received the questionnaire. The questionnaire was immediately re-sent to them by facsimile.

### **3.2.2 Second-round Survey**

#### **3.2.2.1 Pilot test**

Five people were selected from those who had responded to the first-round survey as participants in a pilot test for the second-round survey. They were first contacted and asked by the researcher by either facsimile or e-mail if they would be able to complete a second-round questionnaire within a week. Five of them agreed to participate in the pilot test within the requested time frame. A draft of the second-round questionnaire was sent to them by facsimile. Four of them returned a completed questionnaire to the researcher.

### **3.2.2.2 Questionnaire**

The second-round questionnaire consisted of Parts I and II (see Appendix D). Part I was composed of a total of 127 obstacles identified by the participants in the first-round survey. The original descriptions of the identified obstacles were used as much as possible in the second-round questionnaire. For some obstacles, however, rewriting of the description was done to ensure that the descriptions would be clear to everyone and that any extreme bias would be eliminated.

While most of the 127 obstacles were assigned by the participants to one of the eight categories in Figure 3.4, some obstacles did not categorize well. The researcher examined the nature of those obstacles and generated four additional categories for those obstacles. They were planning and implementation-oriented, geography-oriented, social system/culture-oriented and corruption-oriented. As a result, all of the 127 obstacles were grouped into one of the following 12 categories:

- 1) Policy and Regulation-oriented obstacles;
- 2) Planning and Implementation oriented-obstacles;
- 3) Organization and Administration-oriented obstacles;
- 4) Finance-oriented obstacles;
- 5) Technology-oriented obstacles;
- 6) Human resources-oriented obstacles;
- 7) Knowledge-oriented obstacles;
- 8) Politics-oriented obstacles;
- 9) Economy-oriented obstacles;
- 10) Geography-oriented obstacles;
- 11) Social system:/Culture-oriented obstacles; and
- 12) Corruption-oriented obstacles.

The pilot test found that the participants fully understood the intention of Part I of the questionnaire. A respondent suggested that participants should be instructed to read all the obstacles within each category before assessing their levels of criticality. Another suggestion was that strongly biased statements should be avoided. The survey participants were asked to read all obstacles within each category, and then assess, using a scale from 1 (not important/critical) to 7 (very important/critical), how critical each obstacle was to any effort to narrow the gap. A sample section of Part I is presented in Figure 3.6.

No.	Section A. Policy and Regulation-oriented obstacles	Not Critical	Very Critical					
1	<b>Monopoly</b> of telecommunications services in some developing countries leads to a slow investment in telecommunications.	1	2	3	4	5	6	7
2	In developing countries <b>policy changes</b> have not taken place in concert with <b>technological changes</b> and <b>customer needs</b> .	1	2	3	4	5	6	7
3	In developing countries policies <b>hinder</b> the introduction of <b>competition</b> and <b>prevent regulation</b> from being <b>separated</b> from operation of telecommunications services.	1	2	3	4	5	6	7
4	In developing countries there is a <b>lack</b> of rational <b>liberalization policies</b> .	1	2	3	4	5	6	7

Figure 3.6. Sample section of part I of the second-round survey

Part II was designed to ask the survey participants to pick a single obstacle that they believed had most seriously hindered telecommunications development in LDCs, to write any current strategies they knew of to overcome the obstacle, and to prescribe some preferable future strategies. The pilot test found that the participants fully understood the intention of Part II of the questionnaire.

By incorporating the suggestions in the pilot test, a final second-round questionnaire was prepared.



### **3.2.2.3 Implementation**

Since 5 out of 410 professionals had been involved in the pilot test for the second-round survey, the remaining 405 professionals were invited to participate in the second-round survey. A package containing an invitation letter from the researcher, the supporting letter from the Secretary-General of the ITU, the second-round questionnaire and a self-addressed return envelope was sent out to all 405 participants.

As the total number of pages of the questionnaire was longer than that of the first-round questionnaire and the speed of postal service in many countries was found to be faster than initially thought, the questionnaire was sent out to all participants by air mail. While postage for the return mail was not enclosed again, a 2 inch x 3 inch adhesive memo pad was enclosed to express the researcher's appreciation of the participants' cooperation. In this round, the invitation letter also stated, as an incentive for promoting their participation, that those who fill out the questionnaire would receive a brief summary of the study when the study was completed. All participants were asked to return a completed questionnaire by facsimile, if possible, or by air mail.

Four weeks after the questionnaire was mailed, a brief reminding letter was sent by facsimile to those participants who had not yet responded to the survey. Several participants responded to the researcher saying that they had somehow not yet received the questionnaire. The questionnaire was immediately re-sent to them by facsimile.

### **3.2.3 Third-round Survey**

#### **3.2.3.1 Questionnaire**

The third-round questionnaire aimed at elaborating the results of the second-round survey. The results of the second-round survey presented a rank ordering of obstacles in each of the 12 categories. The third-round questionnaire listed the top two highly rated obstacles in each category as feedback to the participants. In addition, current strategies and future strategies identified in the second-round survey were presented.

The questions in the third-round questionnaire were fairly straight-forward, the intent being to solicit feedback on the strategies identified in the second-round survey. Thus, a pilot test was not carried out this time.

The questionnaire requested that the survey participants critically analyze the provided current and future strategies and modify, enhance or add new insights to them. The third-round questionnaire is attached as Appendix E.

### **3.2.3.2 Implementation**

Considering that the purpose of the third-round survey was an elaboration of the results of the second-round survey, the questionnaire was sent by facsimile to only those who had responded to the second-round questionnaire. Four weeks after the questionnaire was sent out, a brief reminding letter was sent by facsimile to those participants who had not yet responded to the survey.

In summary, in order to comprehensively investigate the issue of the telecommunications development gap, the current study collected a variety of perspectives of telecommunications practitioners by using an iterative three-round international survey. The iterative three-round survey was designed to address the three research questions sequentially. The first-round questionnaire was designed to examine dimensions of the telecommunications development gap and to identify conceivable obstacles both in LDCs and DCs. The second-round questionnaire, built in information regarding obstacles derived from the first-round survey, assessed the level of negative impact of each obstacle and explored current and future strategies to overcome some of the very critical obstacles. The third-round questionnaire incorporated the results of the obstacle assessment and the strategies identified in the second-round survey, and then elaborated further upon those strategies.

## **CHAPTER 4 RESULTS OF THE SURVEYS**

The first-round survey was carried out from September through October 1994. The second-round survey was conducted from November 1994 through January 1995 and the third-round survey was administered from February through March 1995.

In the following sections, the survey participants are classified according to whether they originate from DCs or LDCs. While there may be several ways to differentiate DCs from LDCs, the study will define DCs as countries that are members of the OECD (Organization of Economic and Cooperation for Development) and LDCs as non-OECD countries.

This chapter consists of five sections. Section 4.1 will describe the participation of the respondents in each round of the survey. Section 4.2 will discuss the results of the survey regarding the nature of the telecommunications development gap. Section 4.3 will present the results of the survey with respect to obstacles to telecommunications development and section 4.4 will discuss the results of the survey regarding current and future strategies to overcoming the obstacles. At last, section 4.5 will conclude the chapter.

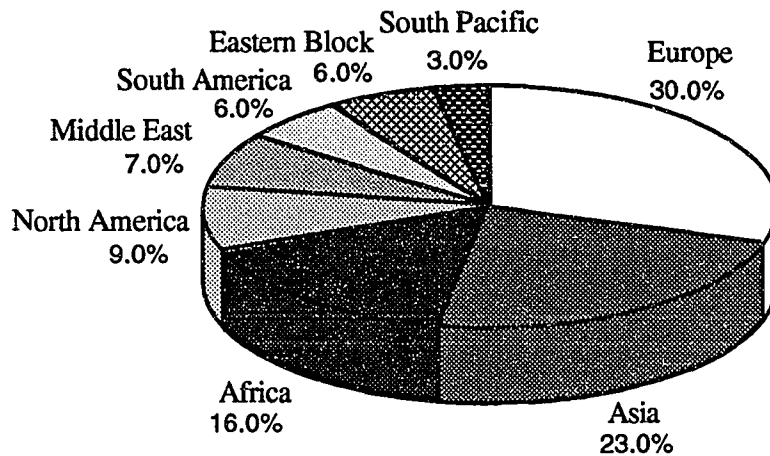
### **4.1 Participants in the Study**

This section will describe the regional distribution of the responding participants as well as distributions of the participants across group (i.e., LDCs and DCs) and professional affiliation in the first-round, second-round and third-round survey.

#### **4.1.1 Participants in the First-round Survey**

Three hundred ninety questionnaires were distributed and 91 responses were received (23.3 % return rate). As the actual survey used the same questions as in the pilot test, responses and demographic information from nine participants in the pilot test were incorporated into those of the actual survey. A regional distribution of the responding

participants is shown in Figure 4.1. A list of the 100 respondents is attached as Appendix F.



**Figure 4.1.** Regional distribution of participants responding to the first-round survey.

Distributions of the participants across group (i.e., LDCs and DCs) and professional affiliation are summarized in Table 4.1. Fifty one participants responded from LDCs and 49 participants from DCs. The affiliation indicated as other includes representatives of international and/or regional organizations and agencies as well as consultants. Around one quarter of the participants were policy makers and/or regulators both in LDCs and DCs. Telecommunications network operators (i.e., A2 + A3) accounted for around 60 % of the participants in LDCs and about 30 % of the participants in DCs. Manufacturers, representatives of international and/or regional organizations and agencies, and consultants (i.e., A4 + A5) accounted for about 15 % of the participants in LDCs and around 40 % of the participants in DCs.

Table 4.1

Participants in the First-round Survey

Affiliation	Group	
	LDCs	DCs
A1: Policy maker and/or regulator	13 (25.5)	13 (26.5)
A2: Government operator or Government operator with operational autonomy	18 (35.3)	3 (6.1)
A3: Government and private joint operator or Private operator	11 (21.6)	11 (22.4)
A4: Manufacturer	2 (3.9)	5 (10.2)
A5: Other	6 (11.8)	16 (32.7)
Missing	1 (2.0)	1 (2.0)
Total	51 (100)	49 (100)

Note. Values enclosed in parentheses represent percentage down the column.

#### 4.1.2 Participants in the Second-round Survey

Four hundred five questionnaires were sent out and 93 responses were received (23.0 % return rate). A regional distribution of the responding participants is shown in Figure 4.2. Distributions of the participants across group and affiliation are summarized in Table 4.2. Forty four participants responded from LDCs and 49 participants from DCs. The breakdown of affiliations across each group was similar to that of the first-round survey. A list of the 93 respondents is attached as Appendix G.

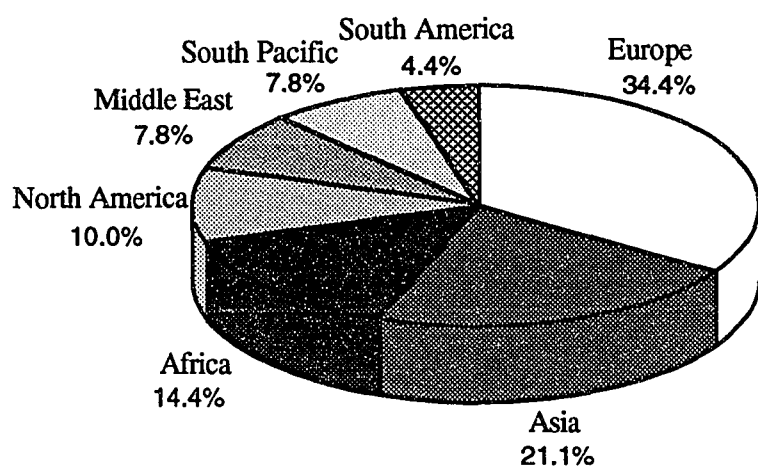


Figure 4.2. Regional distribution of participants responding to the second-round survey.

Table 4.2

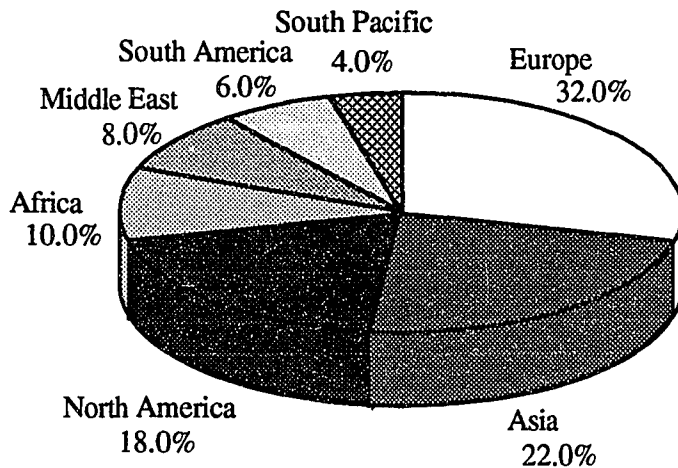
Participants in the Second-round Survey

Affiliation	Group	
	LDCs	DCs
A1: Policy maker and/or regulator	10 (22.7)	12 (26.1)
A2: Government operator or Government operator with operational autonomy	23 (52.3)	8 (17.4)
A3: Government and private joint operator or Private operator	6 (13.6)	8 (17.4)
A4: Manufacturer	-- (--)	6 (13.0)
A5: Other	3 (6.8)	11 (23.9)
Missing	2 (4.5)	1 (2.2)
Total	44 (100)	49 (100)

Note. Values enclosed in parentheses represent percentage down the column.

### 4.1.3 Participants in the Third-round Survey

Ninety three questionnaires were sent out and 50 responses were returned (53.8 % return rate). A regional distribution of the responding participants is shown in Figure 4.3. A list of the 50 respondents is attached as Appendix H.



**Figure 4.3.** Regional distribution of participants responding to the third-round survey.

Distributions of the participants across group and affiliation are summarized in Table 4.3. Twenty one participants responded from LDCs and 29 participants responded from DCs.

Table 4.3

Participants in the Third-round Survey

Affiliation	Group	
	LDCs	DCs
A1: Policy maker and/or regulator	3 (15.0)	5 (17.9)
A2: Government operator or Government operator with operational autonomy	14 (70.0)	3 (10.7)
A3: Government and private joint operator or Private operator	2 (10.0)	7 (25.0)
A4: Manufacturer	-- ( -- )	6 (21.4)
A5: Other	1 (5.0)	7 (25.0)
Missing	1 (2.0)	1 (2.0)
Total	21 (100)	29 (100)

Note. Values enclosed in parentheses represent percentage down the column.

## 4.2 Nature of the Telecommunications Development Gap

This section will first summarize the results of the assessment of the 12 dimensions of the telecommunications gap and the results of ANOVAs and Factor Analysis of the dimensions. Secondly it will discuss other dimensions of the gap and how they can fit into the results of the Factor Analysis of the 12 dimensions.

### 4.2.1 Twelve Dimensions of the Telecommunications Development Gap

The first question in the first-round questionnaire concerned the nature of the telecommunications development gap. Twelve dimensions of the gap were provided in the questionnaire. Their definitions are shown in Table 4.4.



Table 4.4

Definitions of the 12 Dimensions of the Telecommunications Development Gap

Dimension	Description
D1	<b>Unbalanced distribution:</b> The number of telephone sets in a few DCs far exceeds those in all LDCs.
D2	<b>Low teledensity:</b> In general, teledensities in LDCs are lower than those in DCs.
D3	<b>Insufficient capacity:</b> The total capacity of networks in LDCs is not enough.
D4	<b>Long waiting period:</b> The average length of the waiting period for a telephone line is discouragingly long in LDCs.
D5	<b>Poor line quality:</b> The quality of telephone lines is poor.
D6	<b>Poor network condition:</b> Breakdowns occur frequently and faults may take a long time to get repaired.
D7	<b>Domestic gap:</b> More telephones and services are provided in certain areas than in other areas within a nation.
D8	<b>Limited services:</b> Services other than voice telephony are not extensively provided.
D9	<b>Lack of understanding:</b> The catalytic role of telecommunications is not sufficiently understood.
D10	<b>Unsuitable technologies:</b> Technologies brought into LDCs do not match their needs.
D11	<b>Lack of financial resources:</b> Financial resources necessary for telecommunications development are deficient.
D12	<b>Lack of human resources:</b> Human resources necessary for telecommunications development are deficient.

The participants were asked to assess, using a scale from 1 (not important/critical) to 7 (very important/critical), each of the dimensions as to how important/critical it was in

discussing the problems of telecommunications development in LDCs. The mean scores of the 12 dimensions were computed for each group. N was 100, which was the total number of responses to the first-round survey. The results are shown in Figure 4.4.

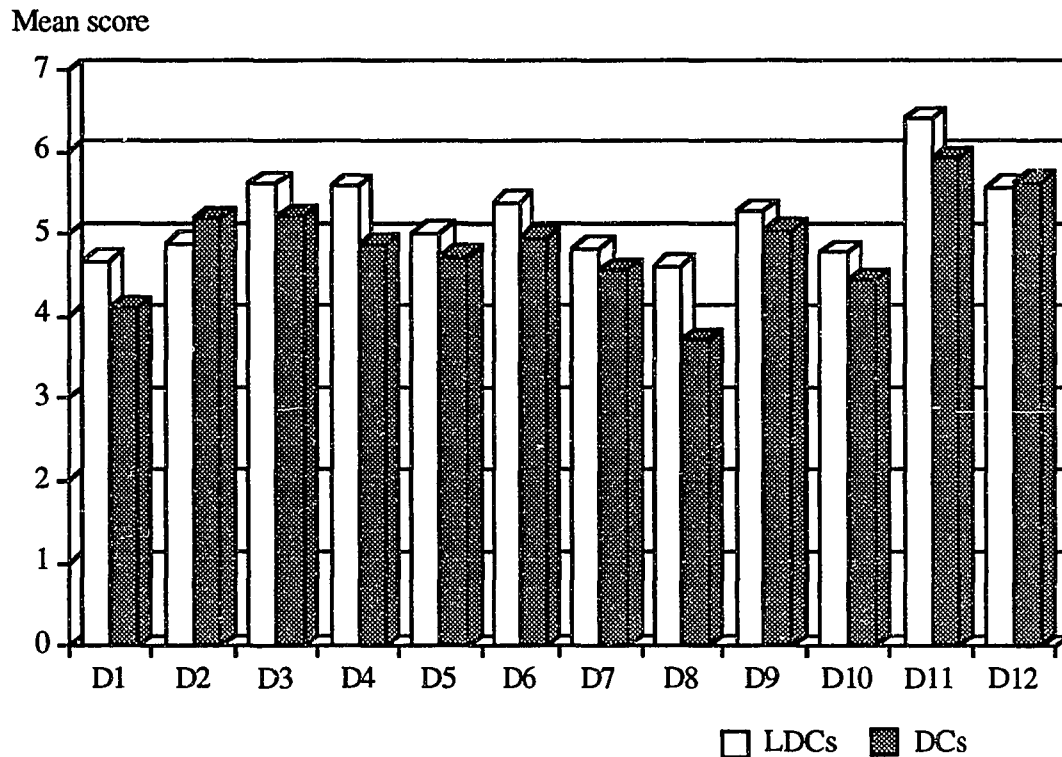


Figure 4.4. Relative importance of the 12 dimensions of the gap.

Firstly, Pearson's correlation test was conducted for the rank order of the dimensions of LDCs and that of DCs. The results showed that the two rank orders were significantly correlated ( $F=0.855$ ,  $p<.001$ ). Secondly, in order to examine similarities and differences of perspectives among affiliation (A1: policy maker and/or regulator; A2: government operator or government operator with operational autonomy; A3: government and private joint operator or private operator; A4: manufacturer; A5: others) and between group (G1: LDCs; G2: DCs) for each of the 12 dimensions of the gap, a 5 x 2 factorial Analysis of

Variance (ANOVA) was computed for each dimension. The results are shown in Table 4.5. N was 100.

Table 4.5

ANOVAs for the 12 Dimensions

Dimension	Effect	df	Sum of Squares	Mean Square	F
D1	Affiliation	4	11.35	2.84	0.85
	Group	1	9.26	9.26	2.77
	Interaction	4	18.27	4.57	1.37
<b>D2</b>	<b>Affiliation</b>	4	31.77	7.94	<b>3.17*</b>
	<b>Group</b>	1	0.02	0.02	0.01
	<b>Interaction</b>	4	10.43	2.61	1.04
D3	Affiliation	4	1.99	0.50	0.29
	Group	1	2.79	2.79	1.63
	Interaction	4	7.16	1.79	1.04
<b>D4</b>	Affiliation	4	6.01	1.50	0.75
	<b>Group</b>	1	15.66	15.66	<b>7.76**</b>
	Interaction	4	16.17	4.04	2.00
D5	Affiliation	4	8.87	2.22	1.08
	Group	1	0.96	0.96	0.47
	Interaction	4	1.24	0.31	0.15
D6	Affiliation	4	3.24	0.81	0.41
	Group	1	3.92	3.92	1.97
	Interaction	4	4.25	1.06	0.53
D7	Affiliation	4	5.16	1.29	0.55
	Group	1	1.70	1.70	0.72
	Interaction	4	22.13	5.53	2.35

\* $p < .05$ . \*\* $p < .01$

Table 4.5 (Continued)

ANOVAs for the 12 Dimensions

Dimension	Effect	df	Sum of Squares	Mean Square	F
D8	Affiliation	4	0.83	0.21	0.13
	Group	1	15.86	15.86	9.82**
	Interaction	4	9.24	2.31	1.43
D9	Affiliation	4	15.42	3.86	1.25
	Group	1	0.00	0.00	0.00
	Interaction	4	9.48	2.37	0.77
D10	Affiliation	4	6.46	1.61	0.61
	Group	1	0.73	0.73	0.28
	Interaction	4	5.61	1.40	0.53
D11	Affiliation	4	10.24	2.56	1.89
	Group	1	1.68	1.68	1.24
	Interaction	4	4.65	1.16	0.86
D12	Affiliation	4	9.05	2.26	1.00
	Group	1	1.61	1.61	0.71
	Interaction	4	4.69	1.17	0.52

\*\*p < .01

There was no interaction between group and affiliation in any of the dimensions. No significant difference of perspectives within affiliation as well as between groups was found for most of the dimensions, except for three dimensions, low teledensity (D2), long waiting period (D4), and limited services (D8). A subsequent one way ANOVA for low teledensity (D2) revealed the main effect for affiliation was attributed to the difference between affiliation "A1: policy maker and/or regulator" (M = 5.77) and "A2: government operator or government operator with operational autonomy" (M = 4.33) and to the difference between affiliation "A1: policy maker and/or regulator" (M = 5.77) and "A3: government and private operator or private operator" (M = 4.50). The results indicated that

policy makers and/or regulators regarded the low teledensities in LDCs as more critical than telecommunications network operators. As to long waiting period (D4), LDCs rated as 5.59 and DCs as 4.88. As to limited services (D8), LDCs rated as 4.61 and DCs as 3.71. The results indicated that the concern of LDCs for these two dimensions (i.e., D4 and D8) was stronger than that of DCs.

A Factor Analysis was then conducted to see if any cluster of dimensions would appear in the 12 dimensions (Babbie, 1989, pp. 450-453). The analysis revealed four clusters of dimensions as shown in Table 4.6.

Table 4.6

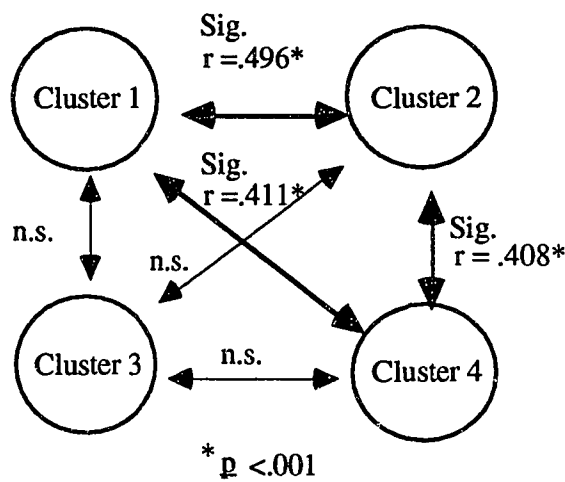
Clusters of the 12 Dimensions of the Gap

Dimension	Cluster			
	1	2	3	4
D5	.900			
D6	.867			
D4	.618			
D10		.778		
D9		.653		
D8		.647		
D12		.527		
D1			.849	
D2			.725	
D7			.625	
D3				.826
D11				.717
	32.1 <sup>a</sup> (32.1 <sup>b</sup> )	16.0 (48.1)	11.3 (59.3)	9.5 (68.8)

Note. The value for each dimension represents a factor loading on the cluster.

<sup>a</sup>Percent of total variance explained. <sup>b</sup>Cumulative percent of total variance explained.

The reliabilities of clusters 1, 2, 3 and 4 are 83.2%, 72.2%, 64.1% and 56.4% respectively. This suggests that at least clusters 1, 2 and 3 are measuring three different characteristics of the gap fairly reliably. Pearson's correlation test was conducted among the four clusters. The results are shown in Figure 4.5. While clusters 1, 2 and 4 were significantly correlated to one another at an alpha level of less than .001, cluster 3 was not correlated with any of the other clusters. This suggests that the nature of cluster 3 is different from the nature of clusters 1, 2 and 4.



**Figure 4.5.** Correlation of four clusters of the gap.

#### 4.2.2 Other Dimensions of the Telecommunications Development Gap

The survey participants were also asked to identify any other dimensions of the telecommunications development gap, if any. An additional 13 dimensions were identified as shown in Table 4.7.

Table 4.7

Other Dimensions of the Gap

Dimension	Description
D13	<b>Underdeveloped service sector:</b> The small proportion of the service sector in GDP in LDCs results in a low demand on telecommunications services.
D14	<b>Lack of local telecommunication industry:</b> Imported products require more money and time and fundamental parts cannot be supplied domestically.
D15	<b>Siphoned revenues:</b> Revenues from telecommunications services are used by governments for non-telecom purposes.
D16	<b>Low income:</b> Potential customers and users cannot afford to pay for services.
D17	<b>Managerial gap:</b> Lack of the managerial expertise needed to lead the telecommunications organization in the changing environment.
D18	<b>Poor network planning</b>
D19	<b>Low priority on maintenance:</b> Lack of emphasis and training in maintenance.
D20	<b>Political influence:</b> Telephone services are available only to certain types of people.
D21	<b>Lack of clear national policy</b>
D22	<b>Weak sector reform:</b> There is a need for more liberalization, deregulation, privatization and competition.
D23	<b>Poor primary infrastructure:</b> Poor roads and power supply.
D24	<b>Obsolete network:</b> Technologically obsolete network cannot support new services.
D25	<b>High tariff:</b> Telephone costs are too expensive for customers.

### **4.3 Obstacles to Telecommunications Development**

This section will discuss obstacles identified in both the first-round and second-rounds of the survey. Sub-section 4.3.1 will summarize the obstacles identified in both the first and second rounds in accordance with their category and origin. Sub-section 4.3.2 will present a full description of the final 127 obstacles. Sub-section 4.3.3 will present a rank order of the obstacles in each of the 12 categories and sub-section 4.3.4. will show an overall rank order of all the 127 obstacles. Sub-section 4.3.5 will summarize the results of a Factor Analysis and independent t-test between LDCs and DCs of the obstacles in each category. Sub-section 4.3.6 will present labels of the identified factors and 4.3.7 will present the similar and differing perspectives of LDCs and DCs toward those factors by showing ANOVA results.

#### **4.3.1 Identified Obstacles**

The first-round questionnaire concerned obstacles that had hindered telecommunications development in LDCs. The survey participants were asked to suggest any obstacles in accordance with the given framework that consisted of category and origin of obstacle. Approximately 400 individual obstacles were identified. Obstacles identified for each category and origin are presented in Table 4.8. The table presents how many distinct obstacles were identified in each category and how many of them were attributed to one of the four origins.



Table 4.8

Identified Obstacles

Category of Obstacle	Origin of Obstacle				Total
	Developing Countries	Developed Countries	International/Regional Telecommunications Organizations	International/Regional Funding/Aid Agencies	
Policy and Regulation	78	9	6	2	95
Organization and Administration	37	-	7	-	44
Finance	34	15	3	21	73
Technology	13	22	4	2	41
Knowledge	17	9	7	2	35
Human resources	24	5	6	2	37
Politics	33	3	1	3	40
Economy	19	4	-	2	25
Other	7	-	-	1	8
Total	262	67	34	35	398

Looking into the characteristics of the identified obstacles, four new categories of obstacle emerged. These obstacles concerned: 1) planning and implementation; 2) geography; 3) social system/culture; and 4) corruption. Since it was noted that the same kind of obstacle was addressed by several people by using slightly different descriptions, some work was done to eliminate redundancy in the answers. As a result, a total of 127 obstacles across 12 categories appeared (see Table 4.9).

Table 4.9

Categories of Obstacles and Number of Items in Each Category

Category of Obstacle	Origin of Obstacle								Total
	LDCs		DCs		International/ Regional Telecommuni- cations Organizations		International/ Regional Funding/Aid Agencies		
	A	B	A	B	A	B	A	B	
Policy and Regulation	13	7	2	1	2	1	--	--	26
Planning and Implementation	4	1	--	1	--	--	--	--	6
Organization and Administration	5	1	--	--	3	--	--	--	9
Finance	12	5	--	--	--	--	5	2	24
Technology	7	1	--	--	--	--	1	--	9
Human resources	4	3	3	--	1	2	--	--	13
Knowledge	--	1	4	2	--	2	--	--	9
Politics	6	9	--	--	2	--	--	--	17
Economy	3	2	--	1	--	--	--	--	6
Geography	1	--	--	--	--	--	--	--	1
Social system/Culture	5	1	--	--	--	--	--	--	6
Corruption	--	1	--	--	--	--	--	--	1
Total	60	32	9	5	8	5	6	2	127

Note. The column A presents the number of items identified by LDCs and column B presents the number of items identified by DCs.

### 4.3.2 Description of the 127 Obstacles

The 127 obstacles were provided in the second-round questionnaire as a feedback from the first-round survey. Their descriptions are shown in Tables 4.10 through 4.21.

Table 4.10

#### Descriptions of Policy and Regulation-Oriented Obstacles (pr)

Item	Description
pr1	<b>Monopoly</b> of telecommunications services in some LDCs leads to a slow investment in telecommunications.
pr2	In LDCs <b>policy changes have not taken place</b> in concert with technological changes and customer needs.
pr3	In LDCs <b>policies hinder</b> the introduction of competition and prevent regulation from being separated from the operation of telecommunications services.
pr4	In LDCs there is a <b>lack of rational liberalization policies</b> .
pr5	Despite liberalizing their telecommunications sector, some LDCs <b>have not been very successful in creating a regulatory body at arm's length</b> from the incumbent operator and this has created some problems for new entrants to compete in what was supposed to be a level playing field.
pr6	Developing countries <b>simply copy the policies and regulations of DCs</b> without consideration of differences in conditions.
pr7	Developed countries <b>use their own policy and regulation</b> (i.e., deregulation) as a standard and apply them to LDCs which may be at different stages of development.
pr8	<b>Policy and regulation</b> of teleccommunications are often imposed by international and/or regional funding agencies.
pr9	International and/or regional telecommunication organizations <b>do not take into account</b> the fact telecommunications <b>infrastructure and needs for development vary substantially</b> from one country to another.

Table 4.10 (Continued)

Descriptions of Policy and Regulation-Oriented Obstacles (pr)

Item	Description
pr10	Policy and regulation from international and/or regional telecommunication organizations sometimes <b>do not consider local customs, cultures and idiosyncrasies.</b>
pr11	A <b>premature introduction of extensive competition</b> in LDCs can limit the capacity of the incumbent telecommunication operators from meeting their universal service obligation.
pr12	In some LDCs, <b>privatization is introduced without competition and/or appropriate regulations.</b>
pr13	<b>Policies and regulations</b> in some LDCs <b>deter</b> the development of <b>value added services.</b>
pr14	In some LDCs <b>the message of the "Missing Link" is not fully appreciated.</b> Lip service is given to the concept, whilst in practice it is a relatively low national priority.
pr15	<b>High call charges</b> are a contributing factor to slow telecommunications growth.
pr16	<b>High rental costs</b> of telecommunications equipment are a contributing factor to the slow telecommunications growth.
pr17	Developing countries are <b>very slow in opening their telecommunication markets</b> to national and international operators.
pr18	<b>Policy and regulation</b> in LDCs <b>have not allowed</b> the telecommunications service industry to be organized and developed as <b>an efficient, cost-based, commercial organization</b> , able to attract high quality staff and capital from commercial resources.
pr19	In LDCs <b>the goal of public policies</b> in the field of telecommunications is very often <b>not to decrease the gap but to regulate the development</b> of the sector.
pr20	In some LDCs <b>the separation of postal service and telecommunications service is not implemented.</b>

Table 4.10 (Continued)

Descriptions of Policy and Regulation-Oriented Obstacles (pr)

Item	Description
pr21	International and/or regional telecommunications organizations do <b>not involve themselves enough in the national development policies</b> of LDCs. As a result, less effective, micro-development policies are created.
pr22	While DCs (e.g. the European Community) are taking their time in studying and implementing changes, LDCs are <b>being pushed to privatize too quickly</b> .
pr23	Policies and regulations in LDCs are <b>bureaucratic</b> and often <b>counter-productive</b> .
pr24	In LDCs <b>there is a concern about privatization - concern over loss of sovereignty</b> over telecommunication which is an important tool of social and economic development.
pr25	<b>The obligation to serve high-cost customers</b> is an obstacle in LDCs.
pr26	<b>Aid policy</b> in DCs <b>gives low priority</b> to telecommunications development.

Table 4.11

Descriptions of Planning and Implementation-Oriented Obstacles (pi)

Item	Description
pi1	Because of the <b>lack of dialogue between users and service providers</b> in LDCs, service providers fail to offer appropriate services and users cannot convey their own needs.
pi2	Some LDCs have <b>poor capability to evaluate data</b> about traffic and needs.

Table 4.11 (Continued)

Descriptions of Planning and Implementation-Oriented Obstacles (pi)

Item	Description
pi3	<b>Improper planning</b> in LDCs results in inefficient use of existing resources and waste of investments.
pi4	<b>Low information systems</b> development results in poor response time to customer requests.
pi5	Developing countries <b>lack long-term oriented</b> planning and/or investment.
pi6	Developed countries and funding/aid agencies <b>do not use long-term oriented planning</b> in assisting LDCs.

Table 4.12

Descriptions of Organization and Administration-Oriented Obstacles (oa)

Item	Description
oa1	Government control means that there is <b>lack of autonomy for the operators</b> in terms of: a) investments and borrowing; b) recruitment and retrenchment; c) salaries; d) tariff setting; and e) purchases.
oa2	<b>Remuneration</b> for qualified staff in government organizations in LDCs is <b>very low</b> , compared to the private sector.
oa3	<b>Uncoordinated development work</b> among different utility providers and property developers add to costs and lead to unnecessary delays in network construction.
oa4	Organization and administration in DCs are more open, customer-focused, market-oriented and very responsive. Whereas organization and administration in LDCs, under the pressure to build up the telecommunications infrastructure, tend to be <b>more bureaucratic and rigid</b> .

Table 4.12 (Continued)

Descriptions of Organization and Administration-Oriented Obstacles (oa)

Item	Description
oa5	Inefficiency within the operator and/or authority organizations is a result of <b>"red tape" and a less service minded approach</b> toward the subscribers.
oa6	In many LDCs telecommunications services are not professionally managed because in several cases they are <b>headed by bureaucrats rather than by technocrats</b> .
oa7	While everyone agrees that the ITU <b>must play a catalytic role</b> to stimulate telecommunications development and bridge the "gap," <b>it is not clear as to what this really means in practice</b> and how the ITU should share the responsibility with the wider ITU family.
oa8	Administrations in international and/or regional telecommunications organizations are <b>more concerned about their self-preservation</b> .
oa9	International and/or regional telecommunications organizations have <b>not helped enough LDCs to establish modern organization and management</b> of the local operators.

Table 4.13

Descriptions of Finance-Oriented Obstacles (fi)

Item	Description
fi1	<b>The heavy investment required to provide the basic infrastructure to the whole country</b> , which is the priority in many LDCs, prevents telecommunications services from being a highly profitable business.
fi2	The governments or monopoly telecommunications operators <b>do not have the financial resources</b> to put in the basic infrastructure.
fi3	<b>The focus</b> of the governments or monopoly telecommunications operators <b>is to provide services to more profitable areas</b> , where less investment is required, <b>rather than in rural areas</b> .

Table 4.13 (Continued)

Descriptions of Finance-Oriented Obstacles (fi)

Item	Description
fi4	<b>Financing</b> of major development projects <b>depends</b> very much on international and/or regional <b>funding institutions</b> .
fi5	<b>A local market base is too small</b> for suppliers to thrive in LDCs.
fi6	<b>Wrong pricing</b> affects the ability of PTTs to generate sufficient funds for network development.
fi7	<b>Poor credit control</b> affects the ability of PTTs to generate sufficient funds for network development.
fi8	<b>The lack of sufficient financial resources in LDCs does not allow them to keep up with changes in technology</b> .
fi9	To reduce the gap, most LDCs must accelerate telecommunications network growth from 3 to 4 per cent per year to around 10 per cent. This will require devoting at least 1 to 2 per cent of GNP to telecommunications investment. <b>This demand for capital will obviously tax all available resources</b> .
fi10	Telecommunication service <b>revenues in LDCs are not dedicated to</b> development of telecommunications.
fi11	<b>Small national budgets in LDCs restrict total investment in</b> telecommunications, even if priority is given to telecommunications.
fi12	<b>National investment priority</b> for telecommunications in LDCs is low.
fi13	There is <b>no security</b> for the foreign private sector <b>for recovering investments</b> in LDCs.
fi14	Developing countries have no other choice besides <b>depending on DCs forever</b> . This is because DCs control, through loans/grants, the kinds of technology, human resource development and knowledge that LDCs receive.
fi15	<b>Funding</b> coming from bilateral and multilateral sources is <b>often slow</b> in responding to LDCs' needs.



Table 4.13 (Continued)

Descriptions of Finance-Oriented Obstacles (fi)

Item	Description
fi16	<b>International and/or regional funding agencies are putting tough conditions</b> on loans to force privatization. That is, no change means no funds.
fi17	<b>Funding</b> coming from bilateral and multilateral sources often <b>attach conditions</b> that have little to do with the economics of telecommunications.
fi18	<b>The funding level</b> from bilateral and multilateral sources is <b>greatly inadequate</b> to narrow the gap.
fi19	<b>Manufacturing investment</b> in LDCs with low market volumes is <b>not profitable enough for foreign investors</b> .
fi20	<b>Developing countries focus on their own needs</b> at the expense of foreign investors' needs.
fi21	<b>Funding</b> from international and/or regional funding agencies to the telecommunications sector in LDCs is <b>only about 2%</b> of their total allocations.
fi22	<b>International and/or regional funding agencies regard commercial loans more appropriate</b> than official loans for telecommunications development in LDCs.
fi23	Since international and/or regional <b>funding/aid agencies put higher priorities on other sectors</b> such as health, water, food and roads than on the telecommunications sector, requirements in the telecommunications sector cannot be met.
fi24	<b>The funding/aid agencies cannot see clearly the recovery of their investments</b> in projects carried out in LDCs.

Table 4.14

Descriptions of Technology-Oriented Obstacles (te)

Item	Description
te1	<b>Technologies are changing too fast</b> for LDCs to apply them economically to their systems.
te2	<b>Developed countries do not provide LDCs with the most advanced technology</b> offered in the market.
te3	<b>The diversity of technological alternatives</b> in the market makes it difficult for some administrations in LDCs to choose the technology best suited to their requirements.
te4	<b>The technology being developed in DCs is geared towards the commercial interests of the manufacturers and the needs of DCs.</b> For instance, the technology offered by DCs often is inappropriate for requirements such as low traffic, rural plain communications, easy implementation, and easy use and maintenance.
te5	<b>Western industry is often willing to sell equipment, technology and services, but less willing to help LDCs build or manufacture their own equipment.</b>
te6	Developed countries <b>push technology driven programs</b> too much.
te7	<b>Manufacturers in DCs sometimes sell old technology.</b>
te8	<b>There is a gap of understanding and practice of "technology transfer"</b> between developed and LDCs. Developed countries usually regard it as "turn-key" commercial sales; LDCs also need knowledge and information. This problem fosters their dependence.
te9	International and regional <b>funding/aid agencies' aid is tied</b> to certain telecommunications equipment.

Table 4.15

Descriptions of Human Resources-Oriented Obstacles (hm)

Item	Description
hm1	<b>Training facilities, in-house or in country, are limited</b> and in many cases it is required to send personnel abroad for training. As a result, a substantial amount of income has to be diverted to human resource development.
hm2	<b>Training and training facilities are not adequately supplied</b> by DCs.
hm3	<b>High staff turnover</b> is a problem in LDCs with strong economic growth. Given the relative scarcity of trained personnel to start with, this environment makes it difficult to plan for continuity and the build up of expertise.
hm4	Developing countries' professionals often do <b>not return to their country</b> of origin for various reasons.
hm5	<b>Education and training aid</b> from international and/or regional telecommunications organizations <b>is insufficient</b> .
hm6	<b>Corruption and nepotism</b> minimizes efficiency and the optimal use of human resources.
hm7	<b>Inadequate educational systems and facilities</b> as well as a <b>lack of interest in higher education</b> hinder efforts to develop human resources in LDCs.
hm8	Developing countries do <b>not emphasize education and training</b> . Inevitably the offers and funds from DCs to help in this area are ignored, wasted, or not even used.
hm9	The development of human resources and the development of competence are jeopardized by <b>the lack of institutional development programs</b> .
hm10	Sponsorship for human resource development activities has been classified into two categories: 1) Least DCs and 2) Non-least DCs (non-LDC). <b>This division has caused</b> some LDCs classified as non-LDC <b>to lag behind</b> in human resource development due to lack of funds to sponsor their nationals.

Table 4.15 (Continued)

Descriptions of Human Resources-Oriented Obstacles (hm)

Item	Description
hm11	International and/or regional telecommunications organizations usually do <b>not collaborate</b> in human resource promotion.
hm12	International and/or regional telecommunications organizations <b>have not helped enough</b> LDCs to <b>set up regional training centers</b> , possibly with branches in different countries.
hm13	<b>Tied assistance</b> for human resource development <b>fails to encourage</b> LDCs to be <b>independent and self sustaining</b> .

Table 4.16

Descriptions of Knowledge-Oriented Obstacles (kw)

Item	Description
kw1	There is a <b>lack of knowledgeable and disinterested advice</b> on various aspects of developing and operating public telecommunication networks. This includes issues such as regulating the sector, implementing a phased program of deregulation, and restructuring, including the introduction of competition.
kw2	When high-technology is implemented, <b>training needs are often neglected</b> .
kw3	<b>The cost of obtaining knowledge is very high</b> due to rapid technology changes.
kw4	Due to rapid technology changes, <b>current knowledge in LDCs becomes obsolete quickly</b> .
kw5	Foreign companies in LDCs often want only to make quick money. They want to <b>sell equipment and forget about the knowledge</b> needed for use and maintenance.
kw6	Understandably, DCs do <b>not easily share their expertise and advanced knowledge</b> with LDCs.

Table 4.16 (Continued)

Descriptions of Knowledge-Oriented Obstacles (kw)

Item	Description
kw7	International and/or regional telecommunications organizations <b>have not paid sufficient attention to the lack of knowledge concerning market mechanisms</b> in LDCs.
kw8	The international and regional telecommunications organizations <b>have not been effective in convincing ministers</b> in LDCs who are responsible for such sectors as finance, development, industry, public safety and health, that becoming a developed country requires developed communications.
kw9	Developing countries <b>lack commercial and financial experts</b> such as accountants, lawyers and marketing experts.

Table 4.17

Descriptions of Politics-Oriented Obstacles (po)

Item	Description
po1	<b>The lack of political stability</b> in most LDCs widens the gap because financiers are not willing to risk their finance in unstable countries.
po2	PTTs have <b>no apparent willingness to develop services quickly</b> or in accordance with the wishes of their customers.
po3	In LDCs, there is <b>little communication between politicians or legislators and telecommunications operators</b> in restructuring the telecommunications sector.
po4	In some LDCs <b>the political will prefers one-way broadcasting</b> to two-way telecommunications.

Table 4.17 (Continued)

Descriptions of Politics-Oriented Obstacles (po)

Item	Description
po5	Generally at the beginning stage of industrialization, telecommunications is <b>not given political support</b> .
po6	In LDCs, <b>politicians are more inclined toward visible results</b> . Usually, telecommunications facilities are regarded as an invisible result.
po7	<b>Self-financing</b> of network expansion in LDCs is <b>severely restricted by politically motivated low-price supply</b> of telecommunications services.
po8	<b>Many politicians don't understand</b> that if they abolish the monopoly system and allow for strong foreign cash flow in new private companies, <b>their countries will rapidly benefit</b> from much better telecommunications services.
po9	For many reasons, but often in large part a rejection of colonial approaches, <b>politics in LDCs has generally focused</b> on social and command economies, <b>rather than economic and market mechanisms</b> focused on facilitating private business growth.
po10	Even if an efficient <b>telecommunications</b> infrastructure is one of the most important <b>prerequisites</b> for the development of an economy and for the development of other areas such as transport, agriculture, health and education, telecommunications tend to <b>be looked at in isolation</b> .
po11	The telecommunication infrastructure has a <b>low national priority</b> compared to other infrastructures.
po12	<b>Political constraints</b> in LDCs hamper improvements in operational productivity and efficiency; for example, retrenchment of excess staff is rarely considered practicable because it can erode established vote banks; and unpopular measures stimulate reactions from trade unions.
po13	<b>Politicians are more concerned about</b> the possibility that uncontrolled access to telecommunications (information) could eventually <b>jeopardize the stability of existing political power</b> structures.

Table 4.17 (Continued)

Descriptions of Politics-Oriented Obstacles (po)

Item	Description
po14	The available <b>financial resources</b> are preferably <b>invested into military and other consumptive fields</b> rather than into building up telecommunications infrastructure.
po15	Due to <b>political influence</b> , telecommunications network distribution may not necessarily serve public demands appropriately.
po16	Financing from <b>funding/aid agencies</b> is often difficult to get as a result of rather <b>stiff terms</b> which sometimes involve political considerations (e.g., democratization, restructuring of the sector in more liberal and commercial terms and sometimes outright demands for complete privatization).
po17	<b>Funding/aid agencies are surreptitiously tying development and humanitarian aid to local or national politics.</b>

Table 4.18

Description of Geography-Oriented Obstacle (go)

Item	Description
go1	In many LDCs, the rural life style of people scattered throughout a wide geographical area results in the requirement for very heavy investment to give service to very small numbers of people. This is <b>not commercially justifiable</b> and presents a <b>huge burden for the operator.</b>

Table 4.19

Descriptions of Economy-Oriented Obstacles (eo)

Item	Description
eo1	The economies of LDCs do <b>not allow</b> them to <b>invest much</b> in the development of their telecommunications networks.
eo2	The economic situation in LDCs often <b>forces the government to give a greater priority</b> , in allocating available resources, to those services related to <b>the basic needs</b> (food, clothing, and shelter).
eo3	<b>Because of low per capita income</b> in LDCs, it is <b>difficult to justify investments</b> in telecommunications.
eo4	Companies of DCs prefer to <b>take profits</b> of telecommunications services provided in LDCs <b>out of those countries</b> instead of reinvesting it there.
eo5	<b>Poor roads and inadequate power supplies</b> add to costs and hamper operations.
eo6	<b>Slow industrialization</b> in LDCs <b>does not produce much demand</b> for communication and <b>does not facilitate manufacturing</b> of telecommunications equipment/systems.

Table 4.20

Description of Corruption-Oriented Obstacle (cr)

Item	Description
cr1	<b>Corruption and kick-backs</b> are still a serious problem and often <b>hinder change</b> .



Table 4.21

Descriptions of Social System/Culture-Oriented Obstacles (ss)

Item	Description
ss1	<b>Illiterate citizens find it difficult to use telephones</b> as they cannot independently operate the telephone.
ss2	The concept of the <b>economies of 'time' is not fully appreciated</b> in LDCs. People do not care about 'time' and don't understand how telecommunications can save time.
ss3	In some LDCs, <b>people prefer communications in person</b> to communications through telecommunications media.
ss4	<b>Telephone services are provided only to certain types of people</b> such as government officials, the military, and the rich.
ss5	Telecommunications projects, being quite technical, have <b>not been able to obtain adequate community participation.</b>
ss6	Due to <b>low income level</b> , the local community cannot effectively participate in the ownership and management of the telecommunications infrastructure.

**4.3.3 Rank Order of the Obstacles in Each Category**

The survey participants were asked to assess, using a scale from 1 (not critical) to 7 (very critical), how critical each obstacle was in any effort to promote telecommunications development in LDCs. All data from LDCs and DCs were compiled. N was 93, which was the total number of responses to the second-round survey.

Firstly, a degree of agreement on the assessment of the participants within each category was checked by computing Kendall's coefficient of concordance (Kerlinger, 1986, p 273). The results showed that assessments among participants in all categories were consistent.

Secondly, mean value and standard deviation were computed for each obstacle.

Tables 4.22 through 4.33 show rank orders of mean scores for the 12 categories.

Table 4.22

Worldwide Rank Order of Means of Policy and Regulation-Oriented Obstacles (pr)

Rank	<u>M</u>	<u>SD</u>	Item
1	5.53	1.17	pr 23
2	5.38	1.30	pr 2
3	5.37	1.28	pr 18
4	5.27	1.21	pr 12
5	5.23	1.25	pr 24
6	5.21	1.34	pr 4
7	5.17	1.42	pr 3
8	5.08	1.50	pr 1
9	4.98	1.44	pr 5
10	4.94	1.25	pr 19
11	4.87	1.54	pr 11
12	4.86	1.30	pr 14
13	4.83	1.53	pr 6
14	4.83	1.60	pr 22
15	4.81	1.62	pr 7
16	4.70	1.65	pr 15
17	4.67	1.51	pr 17
18	4.61	1.61	pr 8
19	4.60	1.40	pr 26
20	4.55	1.47	pr 13
21	4.54	1.45	pr 9
22	4.48	1.42	pr 21
23	4.44	1.76	pr 20
24	4.43	1.55	pr 10
25	4.40	1.54	pr 16
26	4.38	1.53	pr 25

Table 4.23

Worldwide Rank Order of Planning and Implementation-Oriented Obstacles (pi)

Rank	<u>M</u>	<u>SD</u>	Item
1	5.36	1.23	pi 3
2	5.17	1.42	pi 5
3	4.91	1.47	pi 4
4	4.91	1.49	pi 2
5	4.89	1.45	pi 6
6	4.61	1.49	pi 1

Table 4.24

Worldwide Rank Order of Organization and Administration-Oriented Obstacles (oa)

Rank	<u>M</u>	<u>SD</u>	Item
1	5.53	1.44	oa 1
2	5.34	1.21	oa 4
3	5.22	1.17	oa 5
4	4.98	1.60	oa 2
5	4.98	1.39	oa 6
6	4.84	1.55	oa 3
7	4.66	1.51	oa 7
8	4.63	1.38	oa 9
9	4.52	1.54	oa 8

Table 4.25

Worldwide Rank Order of Finance-Oriented Obstacles (fi)

Rank	<u>M</u>	<u>SD</u>	Item
1	5.65	1.41	fi 10
2	5.43	1.37	fi 9
3	5.25	1.46	fi 8
4	5.18	1.44	fi 11
5	5.18	1.67	fi 2
6	5.15	1.40	fi 12
7	5.13	1.45	fi 18
8	5.01	1.44	fi 4
9	4.99	1.39	fi 6
10	4.87	1.66	fi 13
11	4.75	1.39	fi 7
12	4.75	1.55	fi 15
13	4.75	1.61	fi 23
14	4.72	1.62	fi 1
15	4.52	1.30	fi 22
16	4.51	1.46	fi 21
17	4.49	1.63	fi 16
18	4.47	1.82	fi 19
19	4.37	1.56	fi 20
20	4.32	1.48	fi 17
21	4.32	1.56	fi 3
22	4.25	1.48	fi 24
23	4.25	1.58	fi 5
24	4.07	1.73	fi 14

Table 4.26

Worldwide Rank Order of Technology-Oriented Obstacles (te)

Rank	<u>M</u>	<u>SD</u>	Item
1	5.16	1.45	te 8
2	4.77	1.86	te 5
3	4.65	1.51	te 3
4	4.46	1.56	te 4
5	4.40	1.71	te 9
6	4.37	1.68	te 6
7	4.29	1.74	te 7
8	4.25	1.68	te 1
9	3.67	1.74	te 2

Table 4.27

Worldwide Rank Order of Human Resources-Oriented Obstacles (hm)

Rank	<u>M</u>	<u>SD</u>	Item
1	5.16	1.35	hm 6
2	5.11	1.36	hm 3
3	4.98	1.43	hm 4
4	4.88	1.53	hm 1
5	4.83	1.41	hm 9
6	4.73	1.34	hm 5
7	4.72	1.27	hm 7
8	4.59	1.57	hm 2
9	4.58	1.46	hm 12
10	4.52	1.49	hm 13
11	4.43	1.50	hm 8
12	4.13	1.60	hm 10
13	4.08	1.42	hm 11

Table 4.28

Worldwide Rank Order of Knowledge-Oriented Obstacles (kw)

Rank	<u>M</u>	<u>SD</u>	Item
1	5.39	1.33	kw 1
2	5.15	1.31	kw 3
3	5.08	1.39	kw 5
4	5.00	1.45	kw 9
5	4.94	1.49	kw 2
6	4.93	1.31	kw 7
7	4.92	1.50	kw 4
8	4.77	1.72	kw 8
9	4.72	1.39	kw 6

Table 4.29

Worldwide Rank Order of Economy-Oriented Obstacles (eo)

Rank	<u>M</u>	<u>SD</u>	Item
1	5.56	1.20	eo 2
2	5.50	1.19	eo 1
3	5.01	1.44	eo 4
4	4.96	1.32	eo 6
5	4.85	1.54	eo 5
6	4.83	1.42	eo 3

Table 4.30

Worldwide Rank Order of Politics-Oriented Obstacles (po)

Rank	<u>M</u>	<u>SD</u>	Item
1	5.83	1.11	po 1
2	5.42	1.49	po 8
3	5.27	1.35	po 7
4	5.26	1.26	po 10
5	5.14	1.33	po 9
6	5.06	1.38	po 11
7	4.98	1.27	po 5
8	4.98	1.47	po 14
9	4.94	1.38	po 3
10	4.93	1.40	po 6
11	4.86	1.37	po 12
12	4.73	1.53	po 2
13	4.63	1.36	po 16
14	4.45	1.37	po 15
15	4.41	1.51	po 13
16	4.20	1.38	po 17
17	4.16	1.60	po 4

Table 4.31

Worldwide Mean of Geography-Oriented Obstacle (go)

Rank	<u>M</u>	<u>SD</u>	Item
--	5.36	1.49	go 1

Table 4.32

Worldwide Rank Order of Social System/Culture-Oriented Obstacles (ss)

Rank	<u>M</u>	<u>SD</u>	Item
1	4.71	1.59	ss 6
2	4.33	1.47	ss 2
3	4.07	1.63	ss 4
4	4.05	1.43	ss 5
5	3.83	1.48	ss 3
6	3.52	1.67	ss 1

Table 4.33

Worldwide Mean of Corruption-Oriented Obstacle (cr)

Rank	<u>M</u>	<u>SD</u>	Item
--	4.92	1.61	cr 1

**4.3.4. Overall Rank Order of the 127 Obstacles**

In addition to rank orders of the obstacles for individual categories, Tables 4.34 through 4.39 present an overall rank order of all the 127 obstacles based on the results in Tables 4.22 through 4.33. The top 25 obstacles presented in Table 4.34 that roughly account for the top 20 % can be regarded as the most critical. At least one obstacle from all categories but social system/culture and corruption are included among these top 25 obstacles. The top 25 obstacles are described in Table 4.39 and the descriptions of all ranked 127 obstacles are presented in Appendix I



Table 4.34

Top 25 Obstacles

Rank	<u>M</u>	<u>SD</u>	Obstacle												
			pr	pi	oa	fi	te	hm	kw	po	eo	go	ss	cr	
1	5.83	1.11									1				
2	5.65	1.41				10									
3	5.56	1.20									2				
4	5.53	1.17	23												
5	5.53	1.44			1										
6	5.50	1.19										1			
7	5.43	1.37				9									
8	5.42	1.49								8					
9	5.39	1.33							1						
10	5.38	1.30	2												
11	5.37	1.28	18												
12	5.36	1.23		3											
13	5.36	1.49										1			
14	5.34	1.21			4										
15	5.27	1.21	12												
16	5.27	1.35								7					
17	5.26	1.26								10					
18	5.25	1.46				8									
19	5.23	1.25	24												
20	5.22	1.17			5										
21	5.21	1.34	4												
22	5.18	1.44				11									
23	5.18	1.67				2									
24	5.17	1.42	3												
25	5.17	1.42		5											

Note. pr = Policy and Regulation; pi = Planing and Implementation;  
 oa = Organization and Administration; fi = Finance; te = Technology;  
 hm = Human resources; kw = Knowledge; po = Politics; eo = Economy;  
 go = Geography; ss = Social systems/Culture; cr = Corruption.

Table 4.35

From 26th to 50th Obstacles

Rank	<u>M</u>	<u>SD</u>	Obstacle												
			pr	pi	oa	fi	te	hm	kw	po	eo	go	ss	cr	
26	5.16	1.35						6							
27	5.16	1.45					8								
28	5.15	1.31							3						
29	5.15	1.40				12									
30	5.14	1.33								9					
31	5.13	1.45				18									
32	5.11	1.36						3							
33	5.08	1.39							5						
34	5.08	1.50	1												
35	5.06	1.38								11					
36	5.01	1.44				4									
37	5.01	1.44									4				
38	5.00	1.45							9						
39	4.99	1.39				6									
40	4.98	1.27								5					
41	4.98	1.39			6										
42	4.98	1.43						4							
43	4.98	1.44	5												
44	4.98	1.47								14					
45	4.98	1.60			2										
46	4.96	1.32									6				
47	4.94	1.25	19												
48	4.94	1.38								3					
49	4.94	1.49							2						
50	4.93	1.31							7						

Note. pr = Policy and Regulation; pi = Planing and Implementation;  
 oa = Organization and Administration; fi = Finance; te = Technology;  
 hm = Human resources; kw = Knowledge; po = Politics; eo = Economy;  
 go = Geography; ss = Social systems/Culture; cr = Corruption.

Table 4.36

From 51th to 75th Obstacles

Rank	<u>M</u>	<u>SD</u>	Obstacle												
			pr	pi	oa	fi	te	hm	kw	po	eo	go	ss	cr	
51	4.93	1.40										6			
52	4.92	1.50								4					
53	4.92	1.61												1	
54	4.91	1.47		4											
55	4.91	1.49		2											
56	4.89	1.45			6										
57	4.88	1.53						1							
58	4.87	1.54	11												
59	4.87	1.66				13									
60	4.86	1.30	14												
61	4.86	1.37									12				
62	4.85	1.54										5			
63	4.84	1.55			3										
64	4.83	1.41						9							
65	4.83	1.42										3			
66	4.83	1.53	6												
67	4.83	1.60	22												
68	4.81	1.62	7												
69	4.77	1.72								8					
70	4.77	1.86						5							
71	4.75	1.39				7									
72	4.75	1.55				15									
73	4.75	1.61				23									
74	4.73	1.34						5							
75	4.73	1.53									2				

**Note.** pr = Policy and Regulation; pi = Planing and Implementation;  
 oa = Organization and Administration; fi = Finance; te = Technology;  
 hm = Human resources; kw = Knowledge; po = Politics; eo = Economy;  
 go = Geography; ss = Social systems/Culture; cr = Corruption.

Table 4.37

From 76th to 100th Obstacles

Rank	<u>M</u>	<u>SD</u>	Obstacle											
			pr	pi	oa	fi	te	hm	kw	po	eo	go	ss	cr
76	4.72	1.27						7						
77	4.72	1.39							6					
78	4.72	1.62				1								
79	4.71	1.59											6	
80	4.70	1.65	15											
81	4.67	1.51	17											
82	4.66	1.51			7									
83	4.65	1.51						3						
84	4.63	1.36								16				
85	4.63	1.38			9									
86	4.61	1.49		1										
87	4.61	1.61	8											
88	4.60	1.40	26											
89	4.59	1.57							2					
90	4.58	1.46							12					
91	4.55	1.47	13											
92	4.54	1.45	9											
93	4.52	1.30				22								
94	4.52	1.49							13					
95	4.52	1.54			8									
96	4.51	1.46				21								
97	4.49	1.63				16								
98	4.48	1.42	21											
99	4.47	1.82				19								
100	4.46	1.56						4						

Note. pr = Policy and Regulation; pi = Planing and Implementation;  
 oa = Organization and Administration; fi = Finance; te = Technology;  
 hm = Human resources; kw = Knowledge; po = Politics; eo = Economy;  
 go = Geography; ss = Social systems/Culture; cr = Corruption.

Table 4.38

From 101th to 127th Obstacles

Rank	<u>M</u>	<u>SD</u>	Obstacle											
			pr	pi	oa	fi	te	hm	kw	po	eo	go	ss	cr
101	4.45	1.37									15			
102	4.44	1.76	20											
103	4.43	1.50						8						
104	4.43	1.55	10											
105	4.41	1.51								13				
106	4.40	1.54	16											
107	4.40	1.71						9						
108	4.38	1.53	25											
109	4.37	1.56				20								
110	4.37	1.68					6							
111	4.33	1.47											2	
112	4.32	1.48				17								
113	4.32	1.56				3								
114	4.29	1.74					7							
115	4.25	1.48				24								
116	4.25	1.58				5								
117	4.25	1.68					1							
118	4.20	1.38								17				
119	4.16	1.60								4				
120	4.13	1.60						10						
121	4.08	1.42						11						
122	4.07	1.63											4	
123	4.07	1.73				14								
124	4.05	1.43											5	
125	3.83	1.48											3	
126	3.67	1.74						2						
127	3.52	1.67											1	

**Note.** pr = Policy and Regulation; pi = Planing and Implementation;  
 oa = Organization and Administration; fi = Finance; te = Technology;  
 hm = Human resources; kw = Knowledge; po = Politics; eo = Economy;  
 go = Geography; ss = Social systems/Culture; cr = Corruption.

Table 4.39

Descriptions of the Top 25 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
1	5.83	1.11	po1	<b>The lack of political stability</b> in most LDCs widens the gap because financiers are not willing to risk their finance in unstable countries.
2	5.65	1.41	fi10	Telecommunication service <b>revenues</b> in LDCs are <b>not dedicated</b> to development of telecommunications.
3	5.56	1.20	eo2	The economic situation in LDCs often <b>forces the government to give a greater priority</b> , in allocating available resources, to those services related <b>to the basic needs</b> (food, clothing, and shelter).
4	5.53	1.17	pr23	Policies and regulations in LDCs are <b>bureaucratic</b> and often <b>counter-productive</b> .
5	5.53	1.44	oa1	Government control means that there is <b>lack of autonomy for the operators</b> in terms of: a) investments and borrowing; b) recruitment and retrenchment; c) salaries; d) tariff setting; and e) purchases.
6	5.50	1.19	eo1	The economies of LDCs do <b>not allow them to invest much</b> in the development of their telecommunications networks.
7	5.43	1.37	fi9	To reduce the gap, most LDCs must accelerate telecommunications network growth from 3 to 4 per cent per year to around 10 per cent. This will require devoting at least 1 to 2 per cent of GNP to telecommunications investment. <b>This demand</b> for capital will obviously <b>tax all available resources</b> .
8	5.42	1.49	po8	<b>Many politicians don't understand</b> that if they abolish the monopoly system and allow for strong foreign cash flow in new private companies, <b>their countries will rapidly benefit</b> from much better telecommunications services.

Table 4.39 (Continued)

Descriptions of the Top 25 Obstacles

Rank	M	SD	Item	Description
9	5.39	1.33	kw1	There is a <b>lack of knowledgeable and disinterested advice</b> on various aspects of developing and operating public telecommunication networks. This includes issues such as regulating the sector, implementing a phased program of deregulation, and restructuring, including the introduction of competition.
10	5.38	1.30	pr2	In LDCs <b>policy changes have not taken place</b> in concert with technological changes and customer needs.
11	5.37	1.28	pr18	<b>Policy and regulation in LDCs have not allowed</b> the telecommunications service industry to be organized and developed as <b>an efficient, cost-based, commercial organization</b> , able to attract high quality staff and capital from commercial resources.
12	5.36	1.23	pi3	<b>Improper planning</b> in LDCs results in inefficient use of existing resources and waste of investments.
13	5.36	1.49	go1	In many LDCs, the rural life style of people scattered throughout a wide geographical area results in the requirement for very heavy investment to give service to very small numbers of people. This is <b>not commercially justifiable</b> and presents a <b>huge burden for the operator</b> .
14	5.34	1.21	oa4	Organization and administration in DCs are more open, customer-focused, market-oriented and very responsive. Whereas organization and administration in LDCs, under the pressure to build up the telecommunications infrastructure, tend to be <b>more bureaucratic and rigid</b> .
15	5.27	1.21	pr12	In some LDCs, <b>privatization is introduced without competition and/or appropriate regulations</b> .

Table 4.39 (Continued)

Descriptions of the Top 25 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
16	5.27	1.35	po7	<b>Self-financing</b> of network expansion in LDCs is <b>severely restricted by politically motivated low-price supply</b> of telecommunications services.
17	5.26	1.26	po10	Even if an efficient <b>telecommunications infrastructure</b> is one of the most important <b>prerequisites</b> for the development of an economy and for the development of other areas such as transport, agriculture, health and education, telecommunications tend to be <b>looked at in isolation</b> .
18	5.25	1.46	fi8	<b>The lack of sufficient financial resources in LDCs does not allow them to keep up with changes in technology.</b>
19	5.23	1.25	pr24	In LDCs there is a <b>concern about privatization - concern of loss of sovereignty</b> over telecommunication which is an important tool of social and economic development.
20	5.22	1.17	oa5	Inefficiency within the operator and/or the authorities is a result of <b>"red tape" and a less service minded approach</b> toward the subscribers.
21	5.21	1.34	pr4	In LDCs there is a <b>lack of rational liberalization policies</b> .
22	5.18	1.44	fi11	<b>Small national budgets in LDCs restrict total investment</b> in telecommunications, even if priority is given to telecommunications.
23	5.18	1.67	fi2	The governments or monopoly telecommunications operators <b>do not have the financial resources</b> to put in the basic infrastructure.



Table 4.39 (Continued)

Descriptions of the Top 25 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
24	5.17	1.42	pr3	In LDCs <b>policies hinder</b> the introduction of competition <b>and prevent</b> regulation from being separated from the operation of telecommunications services.
25	5.17	1.42	pi5	Developing countries <b>lack long-term oriented</b> planning and/or investment.

#### **4.3.5. Factor Analysis and T-test of the Obstacles**

Ten categories contain more than one obstacle. A Factor Analysis was carried out for each of the ten categories of obstacles to see if there were clusters among those multiple obstacles. N was 93, which was the total number of responses to the second-round. The results revealed that seven out of the ten categories had a couple of factors within them.

The rank order of the obstacles in each category presented in section 4.3.3 and the overall rank order of the 127 obstacles in section 4.3.4 represent rank orders across the world. The data from LDCs and DCs were aggregated and used to determine the rank orders. Since the assessment of a particular obstacle by LDCs was not always the same as the assessment by DCs, an independent t-test between the assessment of LDCs and the assessment of DCs was carried out for each obstacle.

The results of the Factor Analysis and independent t-test are presented in accordance with the identified factors in Tables 4.40 through 4.57.

Table 4.40

Factors in Policy and Regulation-oriented Obstacles

Obstacle	Factor			
	PRF 1	PRF 2	PRF 3	PRF 4
pr 24	.778			
pr 3	.735			
pr 23	.710			
pr 2	.693			
pr 1	.684			
pr 4	.657			
pr 17	.635			
pr 18	.600			
Alpha	(0.883)			
pr 6		.824		
pr 7		.785		
pr 8		.734		
pr 11		.699		
pr 22		.612		
pr 9		.571		
Alpha		(0.870)		
pr 16			.878	
pr 15			.839	
Alpha			(0.902)	
pr 12				.778
pr 5				.559
Alpha				(0.507)
	33.6 <sup>a</sup>	13.3	6.7	4.2
	(33.6 <sup>b</sup> )	(46.9)	(53.5)	(57.7)

Note. The value for each item represents a factor loading on the factor.

<sup>a</sup>Percent of total variance explained. <sup>b</sup>Cumulative percent of total variance explained.

Table 4.41

Comparison of Mean Scores for LDCs and DCs of Policy and Regulation-oriented Obstacles by Factor

Item	Rank	$\bar{M}^a$	$\bar{M}^b$	t	Description
Factor I (PRF 1)					
pr24	5	5.24	5.22	0.06	In LDCs there is a concern about <b>privatization - concern of loss of sovereignty</b> over telecommunication which is an important tool of social and economic development.
pr3	7	5.20	5.13	0.25	In LDCs <b>policies hinder</b> the introduction of competition and <b>prevent</b> regulation from being separated from the operation of telecommunications services.
pr23	1	5.76	5.33	1.76	Policies and regulations in LDCs are <b>bureaucratic</b> and often <b>counter-productive</b> .
pr2	2	5.55	5.22	1.20	In LDCs <b>policy changes have not taken place</b> in concert with technological changes and customer needs.
pr1	8	5.14	5.02	0.36	<b>Monopoly</b> of telecommunications services in some LDCs leads to a <b>slow investment</b> in telecommunications.
pr4	6	5.34	5.09	0.90	In LDCs there is a <b>lack of rational liberalization policies</b> .
pr17	17	4.59	4.74	-0.46	LDCs are <b>very slow in opening their telecommunication markets</b> to national and international operators.
pr18	3	5.50	5.24	0.93	<b>Policy and regulation</b> in LDCs have <b>not allowed</b> the telecommunications service industry to be organized and developed as <b>an efficient, cost-based, commercial organization</b> , able to attract high quality staff and capital from commercial resources.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

Table 4.41 (Continued)

Comparison of Mean Scores for LDCs and DCs of Policy and Regulation-oriented Obstacles by Factor

Item	Rank	$M^a$	$M^b$	t	Description
<b>Factor 2 (PRF 2)</b>					
pr6	13	5.27	4.41	2.76**	<b>LDCs simply copy the policies and regulations of DCs</b> without consideration of differences in conditions.
pr7	15	5.19	4.46	2.17*	<b>DCs use their own policy and regulation</b> (i.e., deregulation) as a standard and apply them to LDCs which may be at different stages of development.
pr8	18	4.81	4.41	1.17	<b>Policy and regulation of telecommunications are often imposed</b> by international and/or regional funding agencies.
pr11	11	5.22	4.51	2.24*	<b>A premature introduction of extensive competition</b> in LDCs can limit the capacity of the incumbent telecommunication operators from meeting their universal service obligation.
pr22	14	5.49	4.22	4.07**	While DCs (e.g. European Community) are taking their time in studying and implementing changes, <b>LDCs are being pushed to privatize quickly.</b>
pr9	21	4.81	4.29	1.70	International and/or regional telecommunication organizations <b>do not take into account the fact telecommunications infrastructure and needs for development vary substantially</b> from one country to another.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\* $p < .05$ . \*\* $p < .01$ .

Table 4.41 (Continued)

Comparison of Mean Scores for LDCs and DCs of Policy and Regulation-oriented Obstacles by Factor

Item	Rank	$M^a$	$M^b$	t	Description
<b>Factor 3 (PRF 3)</b>					
pr16	25	4.58	4.24	1.05	<b>The high rentals of telecommunications equipment are a contributing factor to the slow telecommunications growth.</b>
pr15	16	4.86	4.54	0.91	<b>The high call charges are a contributing factor to the slow telecommunications growth.</b>
<b>Factor 4 (PR 4)</b>					
pr12	4	5.66	4.89	3.14**	<b>In some LDCs, privatization is introduced without competition and/or appropriate regulations.</b>
pr5	9	4.98	4.98	0.00	<b>Despite liberalizing their telecommunications sector, some LDCs have not been very successful in creating a regulatory body at arm's length from the incumbent operator and this has created some problems for new entrants to compete in what was supposed to be a level playing field.</b>

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\*\*p < .01.

Table 4.42

Comparison of Mean Scores for LDCs and DCs of Planning and Implementation-oriented Obstacles

Item	Rank	<u>M</u> <sup>a</sup>	<u>M</u> <sup>b</sup>	t	Description
pi1	6	5.00	4.26	2.39*	Because of <b>lack of dialogue between users and service providers</b> in LDCs, service providers fail to offer appropriate services to users and users cannot convey their own needs.
pi2	4	5.36	4.50	2.80**	Some LDCs have <b>poor capacity to evaluate data</b> about traffic and needs.
pi3	1	5.81	4.93	3.60**	<b>Improper planning</b> in LDCs results in inefficient use of existing resources and waste of investments.
pi4	3	5.58	4.28	4.71**	<b>Low information systems</b> development results in poor response time to customer requests.
pi5	2	5.64	4.74	3.12**	LDCs <b>lack long-term oriented</b> planning and/or investment.
pi6	5	5.34	4.48	2.87**	DCs and funding/aid agencies <b>do not use long-term oriented planning</b> in assisting LDCs.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\* $p < .05$ . \*\* $p < .01$ .

Table 4.43

Factors in Organization and Administration-oriented Obstacles

Obstacle	Factor		
	OAF 1	OAF 2	OAF 3
oa 8	.818		
oa 9	.751		
oa 7	.740		
Alpha	(0.735)		
oa 5		.813	
oa 4		.769	
oa 2		.628	
Alpha		(0.664)	
oa 6			.778
Alpha			(n.a. <sup>a</sup> )
	38.4 <sup>b</sup>	15.5	11.4
	(38.4 <sup>c</sup> )	(53.9)	(65.3)

Note. The value for each item represents a factor loading on the factor.

<sup>a</sup>A Cronbach alpha can't be computed for factor 3, because the factor has only one item in it. <sup>b</sup>Percent of total variance explained. <sup>c</sup>Cumulative percent of total variance explained.



Table 4.44

Comparison of Mean Scores for LDCs and DCs of Organization and Administration-oriented Obstacles by Factor

Item	Rank	$\underline{M}^a$	$\underline{M}^b$	t	Description
Factor 1 (OAF 1)					
oa8	9	4.63	4.41	0.66	Administrations in international and/or regional telecommunications organizations are <b>more concerned about their self-preservation.</b>
oa9	8	5.00	4.28	2.53**	International and/or regional telecommunications organizations have <b>not helped enough LDCs to establish modern organization and management</b> of the local operators.
oa7	7	4.79	4.54	0.77	While everyone agrees that the ITU must <b>play a catalytic role</b> to stimulate telecommunications development and bridge the "gap," <b>it is not clear as to what this really means in practice</b> and how the ITU should share the load with the wider ITU family.
Factor 2 (OAF 2)					
oa5	3	5.38	5.07	1.27	Inefficiency within the operator and/or the authorities is a result of <b>"red tape" and a less service minded strategy</b> toward the subscribers.
oa4	2	5.51	5.17	1.33	Organization and administration in DCs are more open, customer-focused, market-oriented and very responsive. Whereas organization and administration in LDCs, under the pressure to build up the telecommunications infrastructure, tend to be <b>more bureaucratic and rigid.</b>
oa2	4	5.51	4.48	3.21**	<b>Remuneration</b> for qualified staff in government organizations in LDCs is <b>very low</b> , compared to the private sector.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\*\* $p < .01$ .

Table 4.44 (Continued)

Comparison of Mean Scores for LDCs and DCs of Organization and Administration-oriented Obstacles by Factor

Item	Rank	$M^a$	$M^b$	t	Description
<b>Factor 3 (OAF 3)</b>					
oa6	5	4.93	5.02	-0.31	In many LDCs telecommunications services are not professionally managed because in several cases they are <b>headed by bureaucrats rather than by technocrats.</b>

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

Table 4.45

Factors in Finance-oriented Obstacles

Obstacle	Factor					
	FIF 1	FIF 2	FIF 3	FIF 4	FIF 5	FIF 6
fi 5	.728					
fi 14	.678					
fi 19	.675					
fi 8	.632					
fi 16	.545					
Alpha	(0.836)					
fi 21		.794				
fi 15		.693				
fi 22		.631				
fi 18		.554				
Alpha		(0.790)				
fi 2			.773			
fi 1			.636			
fi 4			.589			
fi 3			.584			
fi 23			.510			
Alpha			(0.761)			

Note. The value for each item represents a factor loading on the factor.

Table 4.45 (Continued)

Factors in Finance-oriented Obstacles

Obstacle	Factor					
	FIF 1	FIF 2	FIF 3	FIF 4	FIF 5	FIF 6
fi 20				.784		
fi 24				.692		
fi 17				.599		
Alpha				(0.799)		
fi 12					.691	
fi 10					.608	
fi 9					.571	
fi 11					.546	
Alpha					(0.750)	
fi 6						.876
fi 7						.686
Alpha						(0.748)
	35.4 <sup>a</sup> (35.4 <sup>b</sup> )	7.9 (43.3)	6.4 (49.7)	5.9 (55.6)	5.8 (61.4)	4.5 (65.9)

Note. The value for each item represents a factor loading on the factor.

<sup>a</sup>Percent of total variance explained. <sup>b</sup>Cumulative percent of total variance explained.

Table 4.46

Comparison of Mean Scores for LDCs and DCs of Finance-oriented Obstacles by Factor

Item	Rank	$M^a$	$M^b$	t	Description
Factor 1 (FIF 1)					
fi5	23	4.65	3.87	2.39*	<b>A local market base is too small</b> for suppliers to thrive in LDCs.
fi14	24	4.64	3.53	3.14**	LDCs have no other choice besides <b>depending on DCs forever</b> . This is because DCs control, through loans/grants, the kinds of technology, human resource development and knowledge that LDCs receive.
fi19	18	4.81	4.15	1.71	<b>Manufacturing investment</b> in LDCs with low market volumes is not profitable enough for foreign investors.
fi8	3	5.73	4.40	3.14**	<b>The lack of sufficient financial resources</b> in LDCs does not allow them to keep up with changes in technology.
fi16	17	4.88	4.13	2.22*	International and/or regional <b>funding agencies are putting tough conditions</b> on loans to force privatization. That is, no change means no funds.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\* $p < .05$ . \*\* $p < .01$ .

Table 4.46 (Continued)

Comparison of Mean Scores for LDCs and DCs of Finance-oriented Obstacles by Factor

Item	Rank	$\bar{M}^a$	$\bar{M}^b$	t	Description
Factor 2 (FIF 2)					
fi21	16	4.97	4.10	2.86**	<b>Funding</b> from international and/or regional funding agencies to the telecommunications sector <b>is only about 2%</b> of their total allocations.
fi15	12	5.26	4.28	3.11**	<b>Funding</b> coming from bilateral and multilateral sources <b>is often slow</b> in responding to LDCs' needs.
fi22	15	5.13	4.00	4.42**	International and/or regional <b>funding agencies regard commercial loans more appropriate</b> than official loans for telecommunications development in LDCs.
fi18	7	5.05	5.20	-0.50	<b>The funding level</b> from bilateral and multilateral sources <b>is greatly inadequate</b> to narrow the gap.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\*\*p < .01.

Table 4.46 (Continued)

Comparison of Mean Scores for LDCs and DCs of Finance-oriented Obstacles by Factor

Item	Rank	$\bar{M}^a$	$\bar{M}^b$	t	Description
Factor 3 (FIF 3)					
fi2	5	5.12	5.24	-0.35	The governments or monopoly telecommunications operators <b>do not have the financial resources</b> to put in the basic infrastructure.
fi1	14	5.00	4.46	1.60	<b>The heavy investment required to provide the basic infrastructure to the whole country</b> , which is the priority in many LDCs, prevents telecommunications services from being a highly profitable business.
fi4	8	5.24	4.80	1.43	<b>Financing</b> of major development projects depends very much on international and/or regional <b>funding institutions</b> .
fi3	21	4.63	4.02	1.86	<b>The focus</b> of the governments or monopoly telecommunications operators is to <b>provide services to more profitable areas</b> , where less investment is required <b>rather than in rural areas</b> .
fi23	13	5.02	4.50	1.54	Since international and/or regional <b>funding/aid agencies put higher priorities on other sectors</b> such as health, water, food and roads than on the telecommunications sector, requirements in the telecommunications sector cannot be met.
Factor 4 (FIF 4)					
fi20	19	4.44	4.30	0.41	<b>LDCs focus on their own needs</b> at the expense of foreign investors' needs.
fi24	22	4.38	4.13	0.78	<b>The funding/aid agencies cannot see clearly the recovery of their investments</b> in projects carried out in LDCs.
fi17	20	4.64	4.02	2.00*	<b>Funding</b> coming from bilateral and multilateral sources often <b>attach conditions</b> that have little to do with the economics of telecommunications.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\*p < .05.

Table 4.46 (Continued)

Comparison of Mean Scores for LDCs and DCs of Finance-oriented Obstacles by Factor

Item	Rank	$M^a$	$M^b$	t	Description
Factor 5 (FIF 5)					
fi12	6	5.44	4.87	1.95	<b>National investment priority</b> for telecommunications in LDCs is low.
fi10	1	5.56	5.74	-0.60	Telecommunication service revenues in LDCs are not dedicated to development of telecommunications.
fi9	2	5.53	5.33	0.72	To reduce the gap, most LDCs must accelerate telecommunications network growth from 3 to 4 per cent per year to around 10 per cent. This will require devoting at least 1 to 2 per cent of GNP to telecommunications investment. <b>This demand for capital will obviously tax all available resources.</b>
fi11	4	5.45	4.93	1.71	<b>Small national budgets</b> in LDCs restrict total investment in telecommunications, even if priority is given to telecommunications.
Factor 6 (FIF 6)					
fi6	9	5.30	4.69	2.10*	<b>Wrong pricing</b> affects the ability of PTTs to generate sufficient funds for network development.
fi7	11	5.26	4.28	3.55**	<b>Poor credit control</b> affects the ability of PTTs to generate sufficient funds for network development.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\* $p < .05$ . \*\* $p < .01$ .

Table 4.47

Factors in Technology-oriented Obstacles

Obstacle	Factor	
	TEF 1	TEF 2
te 1	.869	
te 2	.746	
te 5	.709	
te 6	.707	
te 9	.655	
te 8	.625	
te 7	.579	
Alpha	(0.888)	
te 3		.893
te 4		.777
Alpha		(0.727)
	53.8 <sup>a</sup>	11.3
	(53.8 <sup>b</sup> )	(65.1)

Note. The value for each item represents a factor loading on the factor.

<sup>a</sup>Percent of total variance explained.

<sup>b</sup>Cumulative percent of total variance explained.



Table 4.48

Comparison of Mean Scores for LDCs and DCs of Technology-oriented Obstacles by Factor

Item	Rank	$\bar{M}^a$	$\bar{M}^b$	t	Description
Factor 1 (TEF 1)					
te1	8	4.93	3.61	4.01**	<b>Technologies are changing too fast</b> for LDCs to apply them economically to their systems.
te2	9	4.39	2.95	4.21**	<b>DCs do not provide LDCs with the most advanced technology</b> offered in the market.
te5	2	5.33	4.24	2.83**	<b>Western industry is often willing to sell equipment, technology and services, but less willing to help LDCs build or manufacture</b> their own equipment.
te6	6	5.00	3.74	3.71**	<b>DCs push technology driven programs</b> too much.
te9	5	5.07	3.78	3.81**	<b>International and regional funding/aid agencies' aid is tied to certain telecommunications equipment.</b>
te8	1	5.65	4.69	3.29**	<b>There is a gap of understanding and practice of "technology transfer"</b> between developed and LDCs. DCs usually regard it as "turn-key" commercial sales; LDCs also need knowledge and information. This problem fosters their dependence.
te7	7	5.10	3.52	4.69**	<b>Manufacturers in DCs sometimes sell old technology.</b>

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\*\*p < .01.

Table 4.48 (Continued)

Comparison of Mean Scores for LDCs and DCs of Technology-oriented Obstacles by Factor

Item	Rank	$\bar{M}^a$	$\bar{M}^b$	t	Description
Factor 2 (TEF 2)					
te3	3	5.16	4.16	3.30**	<b>The diversity of technological alternatives</b> in the market makes it difficult for some administrations in LDCs to choose the technology best suited to their requirements.
te4	4	4.93	4.00	2.90**	<b>The technology being developed in DCs is geared towards</b> the commercial interests of the manufacturers and <b>the needs of DCs</b> . For instance, the technology offered by DCs often is inappropriate for requirements such as low traffic, rural plain communications, easy implementation, and easy use and maintenance.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\*\* $p < .01$ .

Table 4.49

Factors in Human Resources-oriented Obstacles

Obstacle	Factor		
	HMF 1	HMF 2	HMF 3
hm 12	.824		
hm 13	.761		
hm 11	.749		
hm 10	.737		
hm 2	.692		
hm 5	.686		
Alpha	(0.895)		
hm 6		.795	
hm 7		.754	
hm 8		.708	
Alpha		(0.837)	
hm 3			.722
hm 1			.715
hm 4			.645
Alpha			(0.685)
	49.0 <sup>a</sup> (49.0 <sup>b</sup> )	10.2 (59.3)	8.6 (67.8)

Note. The value for each item represents a factor loading on the factor.

<sup>a</sup>Percent of total variance explained. <sup>b</sup>Cumulative percent of total variance explained.

Table 4.50

Comparison of Mean Scores for LDCs and DCs of Human Resources-oriented Obstacles by Factor

Item	Rank	$\bar{M}^a$	$\bar{M}^b$	t	Description
Factor 1 (HMF1)					
hm12	9	4.79	4.38	1.31	International and/or regional telecommunications organizations <b>have not helped enough LDCs to set up regional training centers</b> , possibly with branches in different countries.
hm13	10	4.79	4.27	1.64	<b>Tied assistance</b> for human resource development <b>fails to encourage LDCs to be independent and self sustaining.</b>
hm11	13	4.40	3.78	2.10*	International and/or regional telecommunications organizations usually <b>do not collaborate</b> in human resource promotion.
hm10	12	4.67	3.60	3.25**	Sponsorship for human resource development activities has been classified into two categories: 1) Least developed countries and 2) Non-least developed countries. <b>This division has caused some developing countries classified as the latter to lag behind</b> in human resource development due to lack of funds to sponsor their nationals.
hm2	8	4.91	4.27	1.92	<b>Training and training facilities are not adequately supplied by DCs.</b>
hm5	6	4.76	4.71	0.19	<b>Education and training aid</b> from international and/or regional telecommunications organizations is <b>insufficient.</b>

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\* $p < .05$ . \*\* $p < .01$ .

Table 4.50 (Continued)

Comparison of Mean Scores for LDCs and DCs of Human Resources-oriented Obstacles by Factor

Item	Rank	$\bar{M}^a$	$\bar{M}^b$	t	Description
Factor 2 (HMF2)					
hm6	1	4.90	5.40	-1.74	<b>Corruption and nepotism minimizes efficiency and the optimal use of human resources.</b>
hm7	7	4.74	4.71	0.10	<b>Inadequate educational systems and facilities as well as a lack of interest in higher education hinder efforts to develop human resources in LDCs.</b>
hm8	11	4.48	4.38	0.30	<b>LDCs do not emphasize education and training.</b> Inevitably the offers and funds from DCs to help in this area are ignored, wasted, or not even used.
Factor 3 (HMF3)					
hm3	2	5.23	5.00	0.80	<b>High staff turnover</b> is a problem in LDCs with strong economic growth. Given the relative scarcity of trained personnel to start with, this environment makes it difficult to plan for continuity and the build up of expertise.
hm1	4	5.12	4.65	1.44	<b>Training facilities, in-house or in country, are limited</b> and in many cases it is required to send personnel abroad for training. As a result, a substantial amount of income has to be diverted to human resource development.
hm4	3	4.98	4.98	-0.01	LDCs' professionals often <b>do not return to their country</b> of origin for various reasons.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

Table 4.51

Factors in Knowledge-oriented Obstacles

Obstacle	Factor	
	KWF 1	KWF 2
kw 7	.785	
kw 5	.755	
kw 1	.684	
kw 6	.675	
kw 8	.645	
kw 9	.544	
Alpha	(0.805)	
kw 4		.901
kw 3		.813
Alpha		(0.836)
	43.3a	14.7
	(43.3b)	(57.9)

Note. The value for each item represents a factor loading on the factor.

<sup>a</sup>Percent of total variance explained. <sup>b</sup>Cumulative percent of total variance explained.

Table 4.52

Comparison of Mean Scores for LDCs and DCs of Knowledge-oriented Obstacles by Factor

Item	Rank	$M^a$	$M^b$	t	Description
Factor I(KWF1)					
kw7	6	4.95	4.91	0.14	International and/or regional telecommunications organizations <b>have not paid sufficient attention to the lack of knowledge concerning market mechanisms</b> in LDCs.
kw5	3	5.29	4.89	1.34	Foreign companies in LDCs often want only to make quick money. They want to sell <b>equipment and forget about the knowledge</b> needed for use and maintenance.
kw1	1	5.48	5.31	0.58	There is a <b>lack of knowledgeable and disinterested advice</b> on various aspects of developing and operating public telecommunication networks. This includes issues such as regulating the sector, implementing a phased program of deregulation, and restructuring, including the introduction of competition.
kw6	9	5.00	4.47	1.82	Understandably, DCs do <b>not easily share their expertise and advanced knowledge</b> with LDCs.
kw8	8	4.93	4.63	0.81	The international and regional telecommunications organizations <b>have not been effective in convincing ministers</b> in LDCs who are responsible for such sectors as finance, development, industry, public safety and health, that becoming a developed country requires developed communications.
kw9	4	4.64	5.34	-2.29*	LDCs <b>lack commercial and financial experts</b> such as accountants, lawyers and marketing experts.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\* $p < .05$ .

Table 4.52 (Continued)

Comparison of Mean Scores for LDCs and DCs of Knowledge-oriented Obstacles by Factor

Item	Rank	$\bar{M}^a$	$\bar{M}^b$	t	Description
<b>Factor 2(KWF2)</b>					
kw4	7	5.56	4.39	3.87**	Due to rapid technology changes, current knowledge in LDCs becomes obsolete quickly.
kw3	2	5.56	4.77	2.90**	The cost of obtaining knowledge is very high due to rapid technology changes.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\*\*p < .01.

Table 4.53

Factors in Politics-oriented Obstacles

Obstacle	Factor		
	POF 1	POF 2	POF 3
po 17	.786		
po 16	.729		
po 3	.728		
po 15	.675		
po 12	.572		
Alpha	(0.840)		
po 11		.825	
po 10		.787	
po 6		.639	
po 5		.631	
Alpha		(0.830)	

Note. The value for each item represents a factor loading on the factor.



Table 4.53 (Continued)

Factors in Politics-oriented Obstacles

Obstacle	Factor		
	POF 1	POF 2	POF 3
po 9			.789
po 7			.782
po 1			.660
po 8			.639
po 2			.548
Alpha			(0.809)
	39.3 <sup>a</sup> (39.3 <sup>b</sup> )	11.5 (50.8)	7.4 (58.1)

Note. The value for each item represents a factor loading on the factor.

<sup>a</sup>Percent of total variance explained. <sup>b</sup>Cumulative percent of total variance explained.

Table 4.54

Comparison of Mean Scores for LDCs and DCs of Politics-oriented Obstacles by Factor

Item	Rank	M <sup>a</sup>	M <sup>b</sup>	t	Description
Factor 1 (POF 1)					
po17	16	4.69	3.73	3.39**	<b>Funding/aid agencies are indirectly (that is behind the scene) tying development and humanitarian aid to local or national politics.</b>
po16	13	4.95	4.33	2.21*	Financing from <b>funding/aid agencies</b> is often difficult to get as a result of rather <b>stiff terms</b> which sometimes involve political considerations (e.g., democratization, restructuring of the sector in more liberal and commercial terms and sometimes outright demands for complete privatization).
po3	9	5.48	4.44	3.75**	In LDCs, there is <b>little communication between politicians or legislators and telecommunications operators</b> in restructuring the telecommunications sector.
po15	14	4.62	4.29	1.12	Due to <b>political influence</b> , telecommunications network distribution may not necessarily serve public demands appropriately.
po12	11	4.98	4.76	0.73	<b>Political constraints in LDCs make it extremely difficult to improve productivity and efficiency</b> in operations; for example, retrenchment of excess staff is rarely considered practicable because it can erode established vote banks; and unpopular measures stimulate reactions from trade unions.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\* $p < .05$ . \*\* $p < .01$ .

Table 4.54 (Continued)

Comparison of Mean Scores for LDCs and DCs of Politics-oriented Obstacles by Factor

Item	Rank	M <sup>a</sup>	M <sup>b</sup>	t	Description
Factor 2 (POF 2)					
po11	6	5.36	4.78	1.99*	There is a <b>low national priority</b> on telecommunication infrastructure compared to other infrastructures.
po10	4	5.48	5.07	1.54	Even if an efficient <b>telecommunications infrastructure</b> is one of the most important <b>prerequisites</b> for the development of an economy and for the development of other areas such as transport, agriculture, health and education, telecommunications tend to <b>be looked at in isolation</b> .
po6	10	4.98	4.89	0.28	In LDCs, <b>politicians are more inclined toward visible results</b> . Usually, telecommunications facilities are regarded as an invisible result.
po5	7	5.12	4.84	1.01	Generally at the beginning stage of industrialization, telecommunications is <b>not given political support</b> .

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\* $p < .05$ .

Table 4.54 (Continued)

Comparison of Mean Scores for LDCs and DCs of Politics-oriented Obstacles by Factor

Item	Rank	$\bar{M}^a$	$\bar{M}^b$	t	Description
Factor 3 (POF 3)					
po9	5	5.05	5.22	-0.59	For many reasons, but often in large part a rejection of colonial strategies, <b>politics in LDCs has generally focused on social and command economies, rather than economic and market mechanisms</b> focused on facilitating private business growth.
po7	3	5.26	5.28	-0.07	<b>Self-financing</b> of network expansion in LDCs is severely restricted by <b>politically motivated low-price supply</b> of telecommunications services.
po1	1	5.71	5.93	-0.92	<b>The lack of political stability</b> in most LDCs widens the gap because financiers are not willing to risk their finance in unstable countries.
po8	2	5.17	5.65	-1.54	<b>Many politicians don't understand</b> that if they abolish the monopoly system and allow for strong foreign cash flow in new private companies, <b>their countries will rapidly benefit</b> from much better telecommunications services.
po2	12	4.48	4.96	-1.46	PTTs have <b>no apparent willingness to develop services quickly</b> or in accordance with the wishes of their customers.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

While no factor appeared in categories such as planning and implementation, economy, social systems/culture, geography and corruption, comparisons of mean scores are presented in Tables 4.54, 4.55, 4.56 and 4.57.

Table 4.55

Comparison of Mean Scores for LDCs and DCs of Economy-oriented Obstacles

Item	Rank	<u>M</u> <sup>a</sup>	<u>M</u> <sup>b</sup>	t	Description
eo1	2	5.76	5.26	2.00*	The economies of LDCs do <b>not allow</b> them to <b>invest much</b> in the development of their telecommunications networks.
eo2	1	5.67	5.46	0.82	The economic situation in LDCs often <b>forces the government to give a greater priority</b> , in allocating available resources, to those services related to the <b>basic needs</b> (food, clothing, and shelter).
eo3	6	4.95	4.71	0.79	<b>Because of low per capita income</b> in LDCs, it is <b>difficult to justify investments</b> in telecommunications.
eo4	3	5.57	4.47	3.80**	Companies of DCs prefer to <b>take profits</b> of telecommunications services provided in LDCs <b>out of those countries</b> instead of reinvesting it there.
eo5	5	5.02	4.70	1.00	<b>Poor roads and inadequate power supplies</b> add to costs and hamper operations.
eo6	4	5.26	4.67	2.13*	<b>Slow industrialization</b> in LDCs <b>does not produce much demand</b> for communication and <b>does not facilitate manufacturing</b> of telecommunications equipment/systems.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\* $p < .05$ . \*\* $p < .01$ .

Table 4.56

Comparison of Mean Scores for LDCs and DCs of Social System/Culture-oriented Obstacles

Item	Rank	$\bar{M}^a$	$\bar{M}^b$	t	Description
ss1	6	3.81	3.26	1.55	<b>Illiterate citizens find it difficult to use telephones</b> as they cannot independently operate the telephone.
ss2	2	4.68	4.02	2.14*	The concept of the <b>economies of 'time' is not fully appreciated</b> in LDCs. People do not care about 'time' and don't understand how telecommunications can save time.
ss3	5	4.05	3.63	1.33	In some LDCs, <b>people prefer communications in person</b> to communications through telecommunications media.
ss4	3	4.00	4.13	-0.38	<b>Telephone services are provided only to certain types of people</b> such as government officials, the army, and the rich.
ss5	4	4.40	3.71	2.31*	Telecommunications projects, being quite technical, have <b>not been able to obtain adequate community participation</b> .
ss6	1	5.09	4.34	2.25*	Due to <b>low income level</b> , the local community cannot effectively participate in the ownership and management of the telecommunications infrastructure.

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\* $p < .05$ .

Table 4.57

Comparison of Mean Scores for LDCs and DCs of Geography-oriented and Corruption-oriented Obstacles

Item	M <sup>a</sup>	M <sup>b</sup>	t	Description
go1	5.76	5.00	2.47*	In many LDCs, the rural life style of people scattered throughout a wide geographical area results in the requirement for very heavy investment to give service to very small numbers of people. This is <b>not commercially justifiable</b> and presents a <b>huge burden for the operator</b> .
cr1	4.79	5.04	-0.75	<b>Corruption and kick-back</b> are still a serious problem and often <b>hinder change</b> .

<sup>a</sup>This column represents mean scores of LDCs. <sup>b</sup>This column represents mean scores of DCs.

\*p < .05.

#### 4.3.6. Obstacle Factor Descriptions

After reviewing how the obstacles were clustered within the 23 resultant factors, following obstacle factor descriptions were generated as presented in Table 4.58.

Table 4.58

Obstacle Factor Descriptions

Category	Factor	Description
Policy and Regulation	PRF1	Unchanged policies and regulations in LDCs.
	PRF2	Introduced external policy and regulations that do not necessarily match the special conditions of LDCs.

Table 4.58 (Continued)

Factor Descriptions

Category	Factor	Description
Policy and Regulation	PRF3	High tariff in LDCs.
	PRF4	Incomplete regulatory structure in implementing liberalization policy in LDCs.
Organization and Administration	OAF1	Unclear goals of assistance from international and/or regional telecommunications organizations.
	OAF2	Low remuneration for qualified staff in government organizations.
	OAF3	Services provided by bureaucrats not by technocrats.
Finance	FIF1	The small market size and dependency on DCs' resources.
	FIF2	Unsatisfactory official funding from bilateral and multilateral sources.
	FIF3	Too much dependence on international and/or regional funding institutions.
	FIF4	Unsatisfactory conditions for foreign investment.
	FIF5	Inadequate financial resources to the telecommunications sector.
	FIF6	Wrong pricing and poor credit control.
Technology	TEF1	Selling of technology without real technology transfer.
	TEF2	Too many alternative technologies, most of which are designed for DCs' needs.
Human resources	HMF1	Insufficient training assistance.
	HMF2	Corruption and nepotism.
	HMF3	High staff turnover and limited in-country training facilities.



Table 4.58 (Continued)

Factor Descriptions

Category	Factor	Description
Knowledge	KWF1	Lack of knowledgeable and impartial advice.
	KWF2	Rapid technology change and high cost of obtaining new knowledge.
Politics	POF1	Little communication between politicians or legislators and telecommunications operators.
	POF2	Lack of a holistic view about the role of telecommunications and the resulting low national priority for telecommunications development.
	POF3	Political instability and politicians' continuing support of monopoly system.

**4.3.7. Similarities and Differences of Assessment**

One of the main purposes of data analysis in the study was to examine the similarities and differences in perspectives among affiliation (A1: policy maker and/or regulator; A2: government operator or government operator with operational autonomy; A3: government and private joint operator or private operator; A4: manufacturer; A5: others) and between group (G1: LDCs; G2: DCs) for each factor. Thus, 5 x 2 factorial ANOVAs were carried out across affiliation and group to see if there were any statistically significant differences according to affiliation or group, or any interaction between affiliation and group. N was 93. Tables 4.59 through 4.65 present the results of ANOVAs category by category. Any significant effect of interaction is indicated by bolded texts.

Table 4.59

ANOVAs for Obstacle Factors in Policy and Regulation Category

Factor	Effect	df	Sum of Squares	Mean Square	F
PRF 1	Affiliation	4	5.33	1.33	1.43
	Group	1	2.79	2.79	2.99
	Interaction	3	2.06	0.69	0.74
PRF 2	Affiliation	4	1.79	0.45	0.34
	Group	1	12.10	12.10	<b>9.06**</b>
	Interaction	3	4.15	1.38	1.04
PRF 3	Affiliation	4	18.17	4.54	2.13
	Group	1	6.95	6.95	3.26
	Interaction	3	10.04	3.35	1.57
PRF 4	Affiliation	4	5.19	1.30	1.09
	Group	1	4.15	4.15	<b>3.49*</b>
	Interaction	3	0.53	0.18	0.93

\* $p < .1$ . \*\* $p < .01$ .

Table 4.60

ANOVAs for Obstacle Factors in Organization and Administration Category

Factor	Effect	df	Sum of Squares	Mean Square	F
OAF 1	Affiliation	4	11.43	2.86	<b>2.14*</b>
	Group	1	0.40	0.40	0.30
	Interaction	3	4.75	1.58	1.18
OAF 2	Affiliation	4	1.87	0.47	0.48
	Group	1	9.26	9.26	<b>9.47**</b>
	Interaction	3	2.39	0.80	0.82
OAF 3	Affiliation	4	8.15	2.04	1.03
	Group	1	0.06	0.06	0.03
	Interaction	3	0.57	0.19	0.10

\* $p < .1$ . \*\* $p < .01$ .

Table 4.61

ANOVAs for Obstacle Factors in Finance Category

Factor	Effect	df	Sum of Squares	Mean Square	F
FIF 1	Affiliation	4	3.40	0.85	0.57
	<b>Group</b>	1	9.18	9.18	<b>6.18*</b>
	Interaction	3	2.83	0.94	0.64
FIF 2	Affiliation	4	4.17	1.04	0.93
	<b>Group</b>	1	10.00	10.00	<b>8.94**</b>
	Interaction	3	0.42	0.14	0.12
FIF 3	Affiliation	4	2.02	0.50	0.38
	<b>Group</b>	1	5.97	5.97	<b>4.47*</b>
	Interaction	3	2.89	0.96	0.72
FIF 4	Affiliation	4	4.77	1.19	0.72
	<b>Group</b>	1	1.33	1.33	0.81
	Interaction	3	1.08	0.36	0.22
FIF 5	Affiliation	4	3.53	0.88	0.75
	<b>Group</b>	1	0.36	0.36	0.31
	Interaction	3	0.70	0.24	0.20
FIF 6	Affiliation	4	8.61	2.15	1.62
	<b>Group</b>	1	16.35	16.35	<b>12.32**</b>
	Interaction	3	1.89	0.63	0.48

\*p &lt; .05. \*\*p &lt; .01.

Table 4.62

ANOVAs for Obstacle Factors in Technology Category

Factor	Effect	df	Sum of Squares	Mean Square	F
TEF 1	Affiliation	4	2.85	0.71	0.51
	Group	1	19.18	19.18	<b>13.65**</b>
	Interaction	3	2.57	0.86	0.61
TEF 2	Affiliation	4	3.83	0.96	0.57
	Group	1	14.83	14.83	<b>8.90**</b>
	Interaction	3	2.87	0.96	0.57

\*\*p &lt; .01.

Table 4.63

ANOVAs for Obstacle Factors in Human Resources Category

Factor	Effect	df	Sum of Squares	Mean Square	F
HMF 1	Affiliation	4	0.95	0.24	0.16
	Group	1	2.91	2.91	1.91
	Interaction	3	1.35	0.45	0.30
HMF 2	Affiliation	4	0.62	0.16	0.10
	Group	1	0.24	0.24	0.16
	Interaction	3	2.41	0.80	0.52
HMF 3	Affiliation	4	4.25	1.06	0.84
	Group	1	1.98	1.98	1.57
	Interaction	3	5.14	1.71	1.36

Table 4.64

ANOVAs for Obstacle Factors in Knowledge Category

Factor	Effect	df	Sum of Squares	Mean Square	F
KWF 1	Affiliation	4	1.86	0.46	0.42
	Group	1	0.01	0.01	0.00
	Interaction	3	3.88	1.29	1.17
KWF 2	Affiliation	4	6.77	1.69	1.10
	Group	1	11.56	11.56	<b>7.49**</b>
	Interaction	3	0.91	0.30	0.20

\*\* $p < .01$ .

Table 4.65

ANOVAs for Obstacle Factors in Politics Category

Factor	Effect	df	Sum of Squares	Mean Square	F
POF 1	Affiliation	4	0.62	0.16	0.16
	Group	1	9.11	9.11	<b>9.22**</b>
	Interaction	3	3.73	1.24	1.26
POF 2	Affiliation	4	4.98	1.25	1.05
	Group	1	1.23	1.23	1.04
	Interaction	3	2.34	0.78	0.66
POF 3	Affiliation	4	3.89	0.97	0.99
	Group	1	0.00	0.00	0.00
	Interaction	3	0.61	0.20	0.21

\*\* $p < .01$ .

The five categories of obstacles such as planning and implementation, economy, social system/culture, geography and corruption did not have any factors in them. For

planning and implementation, economy, and social system/culture categories containing multiple obstacles, an ANOVA was conducted using an average of the means of all the obstacles in each category. For the geography and corruption categories containing only one obstacle, an ANOVA was conducted using the mean of the obstacle. The results are presented in Table 4.66.

Table 4.66  
ANOVAs for Five Categories

Category	Effect	df	Sum of Squares	Mean Square	F
Planning and Implementation	Affiliation	4	0.86	0.21	0.22
	<b>Group</b>	1	11.85	11.85	<b>12.01***</b>
	Interaction	3	2.64	0.88	0.89
Economy	Affiliation	4	5.09	1.27	1.27
	<b>Group</b>	1	5.82	5.82	<b>5.82**</b>
	Interaction	3	1.16	0.39	0.39
Social System/ Culture	Affiliation	4	2.78	0.70	0.52
	<b>Group</b>	1	4.11	4.11	<b>3.07*</b>
	Interaction	3	1.45	0.48	0.36
Geography	Affiliation	4	8.52	2.13	1.02
	<b>Group</b>	1	10.46	10.46	<b>4.99**</b>
	Interaction	3	6.11	2.04	0.97
Corruption	Affiliation	4	1.70	0.42	0.15
	Group	1	0.93	0.93	0.34
	Interaction	3	0.40	0.47	0.17

\*p < .1. \*\*p < .05. \*\*\*p < .01.

There was only one main effect for affiliation found in factor 1 of organization and administration category (see Table 4.60). An ad hoc one-way ANOVA indicated that the mean score (5.04) of government operator or government operator with operational

autonomy was significantly different from the mean score (3.95) of government and private joint operator or private operator at an alpha level of .03.

There were more significant differences between LDCs and DCs, that is differences between group, in ten factors and four categories (see Table 4.59, 4.60, 4.61, 4.62, 4.64, 4.65, 4.66). Table 4.67 shows comparison of mean scores of LDCs and mean scores of DCs for all the obstacle factors and five categories that did not have any factors. The table indicates to which obstacle factor/category LDCs and DCs gave a similar assessment and in which obstacle factor/category they had a significantly different assessment.

Table 4.67

Comparison of Mean Scores for 23 Obstacle Factors and Five Categories of Obstacles Assessed by LDCs and DCs

Category	Factor	<u>M</u> <sup>a</sup>	<u>M</u> <sup>b</sup>	t
Policy and Regulation	PRF 1	5.31	5.14	0.77
	PRF 2	5.20	4.38	<b>3.32**</b>
	PRF 3	4.72	4.39	1.02
	PRF 4	5.32	4.93	1.67
Organization and Administration	OAF 1	4.81	4.41	1.57
	OAF 2	5.48	4.91	<b>2.66**</b>
	OAF 3	4.93	5.02	-0.31
Finance	FIF 1	4.97	4.09	<b>3.39**</b>
	FIF 2	5.21	4.41	<b>3.46**</b>
	FIF 3	5.07	4.60	<b>1.96*</b>
	FIF 4	4.54	4.14	1.46
	FIF 5	5.51	5.22	1.28
	FIF 6	5.28	4.49	<b>3.16**</b>

<sup>a</sup>This column represents mean scores of LDCs.

<sup>b</sup>This column represents mean scores of DCs.

\* $p < .05$ . \*\* $p < .01$ .

Table 4.67 (Continued)

Comparison of Mean Scores for 23 Obstacle Factors and Five Categories of Obstacles  
Assessed by LDCs and DCs

Category	Factor	$\bar{M}^a$	$\bar{M}^b$	t
Technology	<b>TEF 1</b>	5.07	3.84	<b>4.82**</b>
	<b>TEF 2</b>	5.05	4.07	<b>3.56**</b>
Human resources	HMF 1	4.71	4.22	1.92
	HMF 2	4.71	4.83	-0.48
	HMF 3	5.08	4.88	0.83
Knowledge	KWF 1	5.05	4.93	0.54
	<b>KWF 2</b>	5.58	4.58	<b>3.71**</b>
Politics	<b>POF 1</b>	4.94	4.26	<b>3.08**</b>
	POF 2	5.23	4.89	1.49
	POF 3	5.34	5.46	-0.59
Planning and Implementation	<b>(PI)</b>	5.45	4.56	<b>4.10**</b>
Economy	<b>(EO)</b>	5.37	4.83	<b>2.51*</b>
Geography	<b>(GO)</b>	5.76	5.00	<b>2.47*</b>
Social System/ Culture	<b>(SS)</b>	4.35	3.86	<b>2.04*</b>
Corruption	<b>(CR)</b>	4.78	5.04	-0.75

<sup>a</sup>This column represents mean scores of LDCs.

<sup>b</sup>This column represents mean scores of DCs.

\* $p < .05$ . \*\* $p < .01$ .

#### 4.4 Current and Future Strategies for Overcoming the Obstacles

In the second-round questionnaire, each survey participant was asked to select a single obstacle that he/she believed had most seriously hindered telecommunication development in LDCs and then to describe what current strategies had been taken and what



future strategies should be taken to reduce the effect of or eliminate the obstacle. When the strategies were aggregated, it was noted that some strategies could be applied not only to the specified obstacle but also to other obstacles. The third-round questionnaire was composed of these identified or suggested strategies. The survey participants were asked to carefully analyze them and then to modify, enhance or add new insights to them.

The strategies initially identified or suggested in the second-round survey and the strategies elaborated in the third-round survey were consolidated. This section will describe the results under each category of obstacle. Strategies discussed in section 4.4 are direct quotations from the surveys. All strategies pertaining to a certain obstacle factor are grouped together. Strategies from LDCs are presented first followed by those from DCs.

#### **4.4.1 Strategies for Policy and Regulations-oriented Obstacle Factors (PRF)**

##### **4.4.1.1 Strategies for PRF 1 (Unchanged policies and regulations in LDCs)**

###### **A) From LDCs:**

###### **Current Strategy**

1. The endeavor to keep up with the pace of technological development and progressively introduce modern systems and networks into our infrastructure contributes to further widening of the telecommunications gap between the urban and rural areas. To address this, we have formulated a "Rural Telecommunications Policy" which defines specific targets, timelines and enabling resources. Resources we have directed towards this policy will come to a greater extent from the private sector. Two telecommunication monopolies will apportion at least 5% of their annual capital into the development and extension of telecommunications to the rural areas. This is a requirement in the policy guidelines.

### Future Strategy

1. International and regional telecommunications organizations (like the ITU) should:
  - a) elaborate a clear policy for commercialization/liberalization dedicated to LDCs;
  - b) intensify efforts to advocate this policy to the political establishment in LDCs;
  - and c) cooperate with financial institutions/private investors on policy matters.
2. Seminars and meetings should be organized by money lenders and international and regional organizations on privatization topics and/or how private investment promotes global telecommunication development in LDCs.

### B) From DCs:

#### Current Strategy

1. Ministers are attending international conferences and learning about successful development strategies in other countries.

#### Future Strategy

1. Aim at heightening the awareness of national policy makers in those countries that have not yet given serious consideration in adopting liberalization policies. Activities such as organizing international seminars for policy makers will provide them with successful case studies of other countries of similar status.
2. The ITU must establish a working group to examine various regulatory and privatization models and make recommendations. The ITU's ability to provide experts on regulatory frameworks and the pace of privatization and their data base of companies/institutions which can be contacted provide a ready-made framework for countries with a political will to do so.
3. Successful cases could form the basis of an ITU program to inform the political leadership in LDCs that there can be a win-win outcome.
4. Follow examples of other countries of similar status that have deregulated and are operating as cost-based commercial organizations.

**4.4.1.2 Strategies for PRF 2 (Introduced external policy and regulations that do not necessarily match the special conditions of LDCs)**

A) From LDCs:

Future Strategy

1. Avoid the tendency by policy makers to copy the practices in DCs.

B) From DCs:

Future Strategy

1. Carry out research or surveys before the government takes action towards liberalization or privatization etc.. Foreign consultants may not fully understand a specific country's political, economic, cultural and geographical circumstances, which need to be carefully taken into account so that consultants may provide appropriate suggestions or solutions. The relevant government should carry out surveys by a joint group of experts from both DCs and its own country.

**4.4.1.3 Strategies for PRF 3 (High tariff in LDCs)**

No current/future strategy provided.

**4.4.1.4 Strategies for PRF 4 (Incomplete regulatory structure in implementing liberalization policy in LDCs)**

A) From LDCs:

Current Strategy

1. The current strategy of our government's policy-making agency (Department of Transportation and Communications) and regulatory agency (National Telecommunications Commission) is itself innovative. It allows all private telecommunications operators, duly enfranchised by Congress, to establish local exchange services in assigned regional service areas. Certain operators are allowed to establish toll exchange services and IGF (International Gateway

Facility) and/or cellular mobile phone networks, on condition of establishing specified number of fixed/wired local telephone subscriber lines.

#### Future Strategy

1. The main purpose of encouraging entry is to foster competition which leads to efficiency and to bring in more resources. Policy makers must ensure that these entrants fulfill their commitments in contributing fresh resources.
2. The regulators have to ensure that vicious competition injurious to the economy is discouraged.
3. The regulatory body should be independent from the government. It is very important that the regulatory body can control the operations of public and private companies.
4. The privatization of telecommunications in a developing country should not be carried out at the expense of the development of services in the rural areas. If the companies created are interested in profits only, then they might not find it profitable to spend money developing services in the rural areas. The regulatory body should be involved in the strategic management and investment policy of the company. Steps should be taken to prevent a monopoly situation which can in the long run present the same limitations as a government corporation. The regulatory body should encourage the use of as much local capital as possible. In the short term, it should not sell out its investments in infrastructure but lease it out or use it to buy shares in the independent company. Any agreements to this effect, however, should be made in such a way as not to affect the independence of the company.
5. Turning the operator into an independent company is an important first step. A more important step, however, is to establish a solid regulatory body with an equally sound regulatory framework which will facilitate an orderly growth of the sector.

The establishment of sound regulation cannot be over-emphasized, particularly in a developing country where finance is required not only to bring in new services but also to expand the basic network into the rural areas. In the absence of a good regulatory framework, disorderly competitive entries can take place. Without tariff rebalancing and equitable interconnect arrangements, heavy cream-skimming can take place to the detriment of the dominant carrier on which shoulders normally rest the responsibility for providing universal services. This will not be sustainable in the long term and can stunt national network development.

**B) From DCs:**

**Current Strategy**

1. The ITU has established two study groups within its development sector, whose tasks will be to formulate policy, regulatory, strategy guidelines and recommendations for LDCs. Active participation by as many countries, especially LDCs, and the "small m" members (i.e., private corporations actively participating in the ITU's activities) offers an excellent opportunity for LDCs to obtain good advice about how to get it right.

**Future Strategy**

1. Independent regulatory institutions bring in not only efficient and competitive entry of service providers but also an element of certainty/level playing field, which normally results in greater private sector investments.
2. An efficient telecommunications policy may be implemented either by giving autonomy to the public telecommunications companies and making them operate as if they were private or by privatizing and using regulatory mechanisms to ensure the implementation of such a policy. The steps which might be taken in the former option are as follows: a) separate the regulatory functions from those of service operation; b) ensure that operators are autonomous with regard to their budgets,

running and management; c) ensure there exists a sufficient flow of investment funds each year to allow the development of a long term expansion and modernization plan; d) make buying procedures and contracting of personnel independent; e) separate decisions on the running of the operator from those concerned with industrial policy; and f) adopt a flexible and coherent tariff policy which corresponds to the service offering environment.

#### **4.4.2 Strategies for Planning and Implementation-oriented Obstacles (PI)**

##### **A) From LDCs:**

###### **Current Strategy**

1. Community involvement in infrastructure installation in return for lower phone bills.

###### **Future Strategy**

1. Create an office to implement the installation, operation & maintenance of public telephones in every municipality in the country; provide a time table of implementation; and appropriate an amount for the implementation of the project.
2. Short-term and long-term planning with coordination between different plans.
3. Continuity between related projects to maximize the use of the existing resources, to optimize the cost, and to get the highest benefit and return from the projects.
4. The planning should be made by a centralized department rather than by different departments. The final decision should not be a "one man" decision. The concerned departments should be informed of the decisions and changing of policies and plans.
5. The decision should be made after a deep and comprehensive study. There should be a feasibility study for new projects.
6. Customer needs and the grade of service are important and should be considered in any planning activity.

7. Staff in planning should be dynamic and aware of the vast changes in telecommunications.
8. Studies and implementation should not take such a long time that the project would be outdated by the time it is in service.

B) From DCs:

Future Strategy

1. Regulations and policies don't necessarily have to specify expansion targets/timing/ and resources to be allocated. Nor does the technology have to be determined. The least cost solution for service delivery should be the *modus operandi* (method of operation). Moreover, expansion targets should be based on demand for service rather than a supply driven scenario.
2. Development of the telecommunications structure has to be a compulsory element in any project financed by international or national agencies in aid programs to the LDCs.
3. Set goals, bearing in mind that long term solutions might not ease short term problems. Those long term solutions, however, may have been chosen for a future improved situation.
4. More general management-related goals need to be prioritized even higher to improve quality of assistance. There is too much emphasis on "selling" one's own country's methods and structures. In the future, recipients should be presented with more options.

**4.4.3 Strategies for Organization and Administration-oriented Obstacle Factors (OAF)**

**4.4.3.1 Strategies for OAF 1 (Unclear goals of assistance from international and/or regional telecommunications organizations)**

No current/future strategy provided.

#### **4.4.3.2 Strategies for OAF 2 (Low remuneration for qualified staff in government organizations)**

No current/future strategy provided.

#### **4.4.3.3 Strategies for OAF 3 (Services provided by bureaucrats not by technocrats)**

##### **A) From LDCs:**

###### **Current Strategy**

1. Consultants are being engaged to look into areas such as regulations, laws, financial impact on government, etc., before final submission to Cabinet for corporatization. When the department is corporatized, we control and upgrade investments, borrowing, recruitment and retrenchment, salaries, tariff setting and purchases.

###### **Future Strategy**

1. Turn the operator into an independent company with complete autonomy, and then establish a good and solid regulatory body to control the company's operation and liberalize the market<sup>1</sup>.

##### **B) From DCs:**

###### **Future Strategy**

1. The regulatory body has to be set up first and then establish an independent company<sup>2</sup>.

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<sup>1</sup> Responding to this approach, there was a cautious opinion saying "Although our organization is now transferred into a corporation and is functioning as a quasi-government body, it does not enjoy the autonomy needed for it to function as a commercially oriented, market-driven organization. The continued government control hampers this process."

<sup>2</sup> There was another prudent opinion against this suggestion. It says "Independent company with complete autonomy is not always the solution in less developed countries. Usually, in less developed countries, the independent company is not independent but dependent on officers of related government departments."



#### **4.4.4 Strategies for Finance-oriented Obstacle Factors (FIF)**

##### **4.4.4.1 Strategies for FIF 1 (The small market size and dependency on DCs' resources)**

###### **A) From LDCs:**

No current/future strategy provided.

###### **B) From DCs:**

###### **Future Strategy**

1. A BOT (Build-Operate-Transfer) operation will be a good start. One gets money for the necessary investments to build up a system. During the early years, government won't have too much revenue, but there will be benefits in terms of benefits from other economic activities as a result of better communications. Training and change of mentality of leaders are also required.
2. To increase the size of the national budget, it may be necessary to help local industries expand their turnover and employment. An initial step may be to invite foreign investment, then to localize production by technology transfer.
3. A regional strategy could offer new perspectives and help to reduce the gap in the shorter term. Firstly, a common model for convergence should be established by all participating countries in the region. Secondly, a transitional system needs to be accepted by them even if individually they are at a different stage of restructuring process. Such strategies developed by the European Union since 1986 could be helpful not only for specific areas of economic integration but also for LDCs and for countries with small markets. This offers the best work to close the gap in all but a few countries where ODA (Official Development Assistance) will be needed.
4. The ITU can also encourage groupings of countries to create critical mass/risk-spreading for potential investors/suppliers.

#### **4.4.4.2 Strategies for FIF 2 (Unsatisfactory official funding from bilateral and multilateral sources)**

##### **A) From LDCs:**

###### **Current Strategy**

1. The use of commercial off shore loans as an alternative to bilateral or multilateral funding solves the problem of speed of approval, but may increase the cost of capital to a certain extent.

##### **B) From DCs:**

###### **Future Strategy**

1. Global loan program will be needed to provide funds.
2. To satisfy basic human needs, investment in telecommunications is likely to be minimized. This is happening in international (i.e., United Nations Development Program) and governmental fund aid to the telecommunications sector. To improve this situation, some voluntary organization specialized in telecommunications assistance may be needed.
3. The investment community should be proactive in promoting private investment in telecommunications.

#### **4.4.4.3 Strategies for FIF 3 (Too much dependence on international and/or regional funding institutions)**

No current/future strategy provided.

#### **4.4.4.4 Strategies for FIF 4 (Unsatisfactory conditions for foreign investment)**

No current/future strategy provided.

#### **4.4.4.5 Strategies for FIF 5 (Inadequate financial resources to the telecommunications sector)**

##### **A) From LDCs:**

###### **Current Strategy**

1. Restructure the sector aiming at involvement of a private sector and foreign investors in funding the telecommunications infrastructure.

###### **Future Strategy**

1. Encourage private investments through the reorganization of the sector and by using policy to direct investment into the sector. Such a reorganization, which must not necessarily mean privatization, will enable the sector to more adequately adapt to the ever changing economic environment.
2. Create a private, domestic telecommunication financing institution to mobilize funds from local institutional investors such as pension funds, insurance firms, banks, etc. This institution can be guaranteed an interest rate on their finances. When the time is ripe for private equity participation, the loan can be converted to equity (preference, shares).

##### **B) From DCs:**

###### **Current Strategy**

1. Mandate that new service providers serve both urban and rural areas. This will be more effective if the government provides subsidies to the service providers.

###### **Future Strategy**

1. Have new service providers to put part of their revenues in a Development Fund in order to assure national coverage. The instrument of rollover credits guaranteed by settlement is the most common strategy. (However, an overly high credit volume is reached because the needs of the LDCs are enormous. The more the network is

developed, the more outgoing calls. As a result, settlements are no longer generating large surpluses.)

#### **4.4.4.6 Strategies for FIF 6 (Wrong pricing and poor credit control)**

##### **A) From LDCs:**

###### **Current Strategy**

1. Gradually adjust prices and revenue balancing. Instead of focusing on bringing in funding from outside the sector, readjust tariffs towards cost. This should be a powerful tool in generating internally generated funds and in checking wasteful consumption.

##### **B) From DCs:**

No current/future strategy provided.

#### **4.4.5 Strategies for Technology-oriented Obstacle Factors (TEF)**

##### **4.4.5.1 Strategies for TEF 1 (Selling of technology without real technology transfer)**

##### **A) From LDCs:**

###### **Current Strategy**

1. DCs must help LDCs manufacture their own equipment. This is a moral obligation and a step toward closing the gap. In our country, an strategy used by the Defense department that can be transferred to the telecommunication field. Big international companies awarded large contracts are contractually committed to spend a percentage of the contract value in establishing national companies for technology transfer. The results are promising.

###### **Future Strategy**

1. DCs must help LDCs build or manufacture their own equipment, and in return, these countries, with the assistance of funding organizations, will set up a long term contract to buy new knowledge.

2. Technology transfer should not be seen only as commercial sales by DCs. It is also the ability by LDCs to build and manufacture their own equipment. This involves design, manufacture, installation and maintenance<sup>3</sup>.

B) From DCs:

Two suggestions made were negative about the possibility for LDCs to manufacture telecommunications equipment: 1) it is quite unrealistic to consider local manufacture, except in very special and rare cases where the full infrastructure needed to support a modern electronics manufacturer is available; 2) only a few countries will excel in telecommunications manufacture. This is true in many fields. There are many DCs that do not manufacture telecommunications equipment. For example, switch manufacturing is limited to fewer than a dozen countries.

**4.4.5.2 Strategies for TEF 2 (Too many alternative technologies, most of which are designed for DCs' needs)**

A) From LDCs:

Current Strategy

1. Our experience implementing Telecenters has shown products developed with the support of the community can provide better technical solutions at lower costs. The community's engagement by way of organized sectors such as unions and associations is the best way to find the most adequate technical and economic solutions.

B) From DCs:

No current/future strategy provided.

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<sup>3</sup> Another viewpoint from a LDC stated "The technology gap between developed and developing countries and the fast introduction of new technologies in the telecommunications networks preclude the possibility of manufacturing telecommunications equipment in developing countries in the near future."

#### **4.4.6 Strategies for Human Resources-oriented Obstacle Factors (HMF)**

##### **4.4.6.1 Strategies for HMF 1 (Insufficient training assistance)**

###### **A) From LDCs:**

###### **Future Strategy**

1. Development of our own institutional development programs is crucial for the optimization of the investments made in telecommunications and for the creation of a highly productive and motivated work force.
2. An intense human resources training program is essential at both technological and managerial levels. Highly qualified and professional personnel is a necessary condition by which LDCs can select appropriate technologies and suppliers and make full use of the knowledge transferred from foreign consultancies.

###### **B) From DCs:**

###### **Future Strategy**

1. LDCs lack not only technological expertise but also policy and management expertise. Few countries know why and how to start liberalization and once liberalized, how to implement the liberalized structure on a step-by-step basis. They lack skill and experience in negotiating with their counterparts, particularly with DCs. People need education or training in appropriate educational courses in DCs and/or their own respective countries with assistance from international organizations such as the ITU, the World Bank, etc..
2. Encourage training in more specialized technical/professional fields.
3. Emphasize executive/management training, especially in transition from monopoly to competitive environment.
4. Ministers can only be the very first contact in that field. But the contacts should be given to the experts first. In general, training needs are too often forgotten in administrative, technical and other programs.

#### **4.4.6.2 Strategies for HMF 2 (Corruption and nepotism)**

No current/future strategy provided.

#### **4.4.6.3 Strategies for HMF 3 (High staff turnover and limited in-country training facilities)**

##### **A) From LDCs:**

###### **Current Strategy**

1. Bond trainees to return after completion of training overseas.
2. We have our own institutional development programs since the 1960s. With the help of the ITU, these programs were upgraded and a Telecommunications Training Centre was established in the late 60s/early 70s. We have continued to develop our training material and facilities and are now in a position to provide advanced technical training for other LDCs.

##### **B) From DCs:**

No current/future strategy provided.

#### **4.4.7 Strategies for Knowledge-oriented Obstacle Factors (KW)**

##### **4.4.7.1 Strategies for KWF 1 (Lack of knowledgeable and impartial advice)**

##### **A) From LDCs:**

No current/future strategy provided.

##### **B) From DCs:**

1. Use extensive case studies and modeling to provide objective advice.
2. The ITU, World Bank, OECD, etc., could prepare a number of case studies regarding corporatizing and privatizing public telecommunications operators, establishing an independent regulator and introducing more liberalization and competition in the telecommunication sector. The case studies could be used as a basis for showing and comparing changes through several simple parameters on a

spreadsheet. One example would be a comparison of economic growth and growth in telecommunications between those countries which have liberalized the telecommunications sector and those which have not yet done so.

#### **4.4.7.2 Strategies for KW2 (Rapid technology change and high cost of obtaining new knowledge)**

No current/future strategy provided.

#### **4.4.8 Strategies for Politics-oriented Obstacle Factors (POF)**

##### **4.4.8.1 Strategies for POF 1 (Little communication between politicians or legislators and telecommunications operators)**

No current/future strategy provided.

##### **4.4.8.2 Strategies for POF 2 (Lack of a holistic view about the role of telecommunications and the resulting low national priority for telecommunications development)**

###### **A) From LDCs:**

1. Invite the Minister of Communication to attend conferences on telecommunications to learn about the issues involved. (However, most times the Minister does not attend.)
2. Continue to provide information briefings on telecommunications issues.

###### **B) From DCs:**

###### **Current Strategy**

1. Let politicians know the importance of telecommunications; show the effect of telecommunications infrastructure growth on economic growth with examples in DCs.

###### **Future Strategy**

1. The ITU should sponsor a one week seminar attended by ministers of communications (and country rulers, if feasible). Its objectives would be to



convince participants of the benefits of telecommunication development and to review success stories (cases given by ministers and/or heads of state).

#### **4.4.8.3 Strategies for POF 3 (Political instability and politicians' continuing support of the monopoly system)**

##### **A) From LDCs:**

###### **Current Strategy**

1. Sensitize politicians to private investment as the only means to enhance development of the telecommunication sector in LDCs (especially in rural areas).

##### **B) From DCs:**

###### **Current Strategy**

1. Most politicians are in office for a limited term (say four years at most). It is important to sensitize key officials and other high level decision makers who will be around for a longer time.

###### **Future Strategy**

1. More emphasis should be placed on documenting the alternative costs of current politics/priorities and policies/regulations, i.e., the costs of lost-opportunities; for example, political instability, military expenditure, etc. However, there are enormously strong vested interests.

#### **4.4.9 Strategies for Geography-oriented Obstacles (GO)**

##### **A) From LDCs:**

###### **Current Strategy**

1. Use mobile satellite services, fixed cellular networks and wireless technologies to reach rural subscribers.
2. Satellites have a major role to play in providing communications to scattered populations in remote rural areas. The investment is less compared to that for a

terrestrial infrastructure, but the unit operational cost could be higher due to high satellite charges and maintenance when compared to urban areas.

**B) From DCs:**

**Current Strategy**

1. The increasing use of small, hand-portable mobile earth stations offers an excellent solution. In many instances, mobile satellite services are much more cost effective since they do not require the installation of a costly terrestrial infrastructure.
2. Satellites in particular have a major role to play in providing telecommunications in LDCs due to their ubiquitous coverage and ability to provide instantaneous communication links without the need for substantial investment in terrestrial infrastructure.

**Future Strategy**

1. Develop semi-fixed analog mobile phone cells placed in communities without telecommunications, complete with cheap handsets and VSAT links to regional hubs (i.e., personal low-cost telephony).
2. Two or three pilot projects in selected countries may show an end-to-end wireless system (i.e., radio in local loop/satellite communications) in practice and a rapidly deployable solution that is cost effective. Coupled with a privatization/regulatory framework, the model can be replicated/commercialized rapidly to create momentum.

**4.4.10 Strategies for Other Obstacles**

In both second- and third-round surveys, no strategy was provided for economy, social system/culture and corruption categories. While it is not certain why this happened, it is noted that such obstacles appear to be specifically national in nature rather than related to the general telecommunications sector.

#### **4.5 Summary of the Chapter**

This chapter has reported the results of the three-round international survey concerning the telecommunications development gap. First, the worldwide participation in the three surveys was reported. Secondly, the results and statistical analyses regarding the nature of the telecommunications development gap were presented. Twelve dimensions of the gap were ranked in order and their correlations were examined. Thirdly, the identified obstacles to the telecommunications development, their rankings and the results of the Factor Analyses of the obstacles were presented. A total of 127 obstacles were identified across 12 categories and a total of 23 obstacle factors were distinguished in seven categories. Lastly, current and projected future strategies to reducing the negative effects of the obstacles were compiled. A total of 74 strategies were suggested. The next chapter will discuss each of these results in detail.

## **CHAPTER 5 DISCUSSION OF THE RESULTS**

This chapter consists of four sections. Section 5.1 will discuss the nature of the telecommunications development gap based on the survey participants' assessment of the 12 dimensions of the gap. Section 5.2 will describe characteristics of the obstacles in each of the 12 categories. Section 5.3 will analyze the similarities and differences of the assessment of the obstacles between LDCs and DCs. Section 5.4 will discuss the suggested strategies and explore whether or not some of those strategies are in fact being implemented.

### **5.1 Nature of the Telecommunications Development Gap**

The survey participants quantitatively assessed the level of importance of each of the provided 12 dimensions of the telecommunications development gap. First, this section will examine the similarities and differences of the assessment between LDCs and DCs. Secondly, based on the results of the Factor Analysis, the nature of the gap will be clarified by presenting an analytical framework of the gap. Finally, how the additionally identified 13 dimensions can fit into the framework will be examined.

#### **5.1.1 Similarities and Differences of the Assessment of the 12 Dimensions of the Gap between LDCs and DCs**

The results of Pearson's correlation test indicated that the rank order of the 12 dimensions of the telecommunications development gap for LDCs was significantly correlated with that for DCs ( $F=0.855$ ,  $p<.001$ ). Thus, LDCs and DCs were generally consistent in their assessments of the relative importance of the 12 dimensions.

As seen in Figure 4.4, the top five dimensions to which both LDCs and DCs assigned higher scores were the following: lack of financial resources (D11); lack of human resources (D12); insufficient capacity (D3); poor network condition (D6); and lack of

understanding (D9). These dimensions indicate the lack of resources and knowledge necessary to develop telecommunications.

Both LDCs and DCs were fully consistent in that they considered limited services (D8), unbalanced distribution (D1), unsuitable technologies (D10) and the domestic gap (D7) less critical compared to the other dimensions. These dimensions describe the current conditions of insufficient development of telecommunications.

The results above suggest that the dimensions indicating the lack of resources and knowledge necessary to develop telecommunications need more serious attention than the dimensions describing the current conditions of insufficient development of telecommunications

ANOVAs were carried out to find out if there was any significant difference of assessment for each dimension between LDCs and DCs or among affiliation. A significant difference was found between LDCs and DCs for long waiting period (D4) as well as limited services (D8). Another difference was found among different affiliations of the participants for low teledensity (D2) (see Table 4.5). LDCs ranked the long waiting period dimension (D4) as third with a score of 5.59 and DCs ranked it as seventh with a 4.88. This significant difference probably indicates that the pressing problem of the long waiting period in LDCs is not equally understood by DCs where the waiting list for the telephone service rarely exists now. Although the limited services dimension (D8) was ranked as 12th by both LDCs and DCs, DCs gave a significantly lower score to this dimension than LDCs. Lack of a shared understanding is found in this dimension, too. With regard to the assessment of the low teledensity dimension (D2), policy makers and regulators in LDCs were more concerned about it than telecommunications network operators. As an overall assessment, it should be noted that LDCs assigned higher scores than DCs to 10 out of the 12 dimensions.

### 5.1.2 Three Factors of the Gap

To examine characteristics of the 12 dimensions of the gap, a Factor Analysis of the dimensions was conducted. Four clusters appeared as shown in Table 4.6. After examining the characteristic of each cluster, they have been labeled as shown in Table 5.1.

Table 5.1

#### Four Clusters of Dimensions of the Telecommunications Development Gap

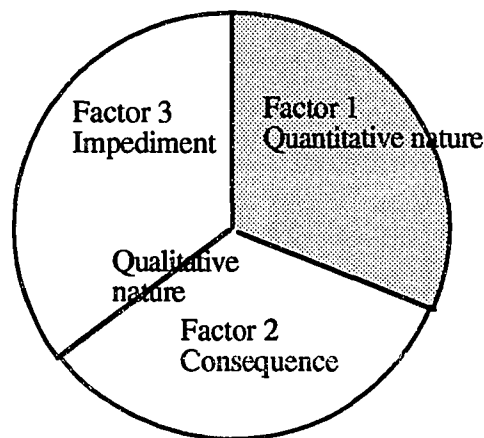
Cluster	Description	Dimension
1	Poor conditions of telecommunication services	D5 Poor line quality D6 Poor network condition D4 Long waiting period
2	Inappropriate technologies, understanding and human resources	D10 Unsuitable technologies D9 Lack of understanding D8 Limited services D12 Lack of human resources
3	Unbalanced distribution of telephones	D1 Unbalanced distribution D2 Low teledensity D7 Domestic gap
4	Lack of financial and service capacity	D3 Insufficient capacity D11 Lack of financial resources

Pearson's correlation test indicated that there were two distinct groups among the four clusters. Cluster 3 was not correlated with any of the other three and clusters 1, 2 and 4 were significantly correlated to one another. The first group, containing only cluster 3, seems to indicate the quantitative nature of the telecommunications development gap. That is, all three dimensions within cluster 3 are often represented by numerical values. The second group consists of clusters 1, 2 and 4. Many of the dimensions in this group are usually elaborated qualitatively rather than quantitatively. Thus, the group appears to

represent the qualitative nature of the gap. Furthermore, examining the characteristics of the three clusters, it can be concluded that cluster 1 indicates consequence of the problem and clusters 2 and 4 seem to point out impediment of the problem.

In order to better understand the analysis, the above observations are summarized as an analytical framework of the telecommunications development gap in Figure 5.1. The figure shows that the problem of the telecommunications development gap has both a quantitative and qualitative nature. It further shows that the qualitative nature is composed of impediment and consequence. As a result, three factors of the gap have appeared.

A score of each factor was computed by averaging scores of the dimensions in each factor. The scores of factor 1, 2 and 3 were 4.72, 5.10 and 5.29 respectively. The result shows that the factor 3, impediment of the gap, was considered as most critical. In fact, 4 of the top 5 dimensions discussed in section 5.1.1 are included in factor 3.



**Figure 5.1.** Analytical framework of the telecommunications development gap.

When the survey participants assessed the level of importance of the 12 dimensions discussed above in the first-round survey, they were also asked to identify additional dimensions, if any. An additional 13 dimensions resulted as shown in Table 4.7. No

rankings of these 13 dimensions were done in subsequent surveys. Instead, a content analysis of the characteristics of these dimensions was conducted by the researcher to examine how these additional dimensions could fit into the framework in Figure 5.1.

Firstly, none of these dimensions describes the quantitative nature of the gap. The obsolete network (D24) presents a consequence of the gap. Dimensions that show impediment of the gap are follows: underdeveloped service sector (D13); siphoned revenues (D15); low income (D16); managerial gap (D17); poor network planning (D18); political influence (D20); lack of clear national policy (D21); weak sector reform (D22); and poor primary infrastructure (D23). Dimensions that could be categorized both into the consequence and impediment aspects are as follows: lack of local telecommunication industry (D14); low priority on maintenance (D19); and high tariff (D25).

While the validity of the above grouping of the additional dimensions cannot be tested in the study, it is worth noting that more dimensions depicting the qualitative nature of the gap were identified than dimensions depicting the quantitative nature. In addition, many of the former dimensions reflect the impediment aspect of the gap.

## **5.2 Characteristics of the Obstacles to Telecommunications Development**

Characteristics of obstacles in each category are discussed in this section by referring to Table 4.40 through 4.57. The discussions reflect rank order, the Factor Analysis of each category, and the similarities and differences of the assessment between LDCs and DCs.

### **5.2.1 Characteristics of Policy and Regulation-oriented Obstacles (see Tables 4.40 and 4.41)**

The LDCs' unwillingness to adapt their policy and regulations to the changing environment of the telecommunications sector is a major obstacle. Furthermore, when liberalization of the telecommunications sector takes place, it is often insufficiently



implemented. LDCs regard privatization without competition and/or without appropriate regulations as a problem. Some LDCs have not been very successful in creating a regulatory body at arm's length from the incumbent operator. It is noted that when policies and regulations in DCs are applied to LDCs as standards or are copied by LDCs without consideration of differences in conditions, they do not generally meet LDCs' unique needs and conditions. Ikenberry (1990) calls these situations as external inducement, emulation and policy bandwagoning.

### **5.2.2 Characteristics of Planning and Implementation-oriented Obstacles**

(see Table 4.42)

This category did not generate any obstacle factors. Assessments of all six obstacles in this category were significantly different between LDCs and DCs. LDCs are more concerned about their own improper planning ability and weak information systems, which result in inefficient use of existing resources, waste of investments and poor responsiveness to customers. They also think that they lack long-term oriented planning and investment. The fact that DCs put relatively lower scores on these items than LDCs might indicate that DCs are unfamiliar with the planning problem of LDCs.

### **5.2.3 Characteristics of Organization and Administration-oriented**

**Obstacles** (see Tables 4.43 and 4.44)

Due to bureaucracy, organizations and administrations in LDCs are less open, less customer-focused, less market-oriented, less responsive and less efficient. LDCs regard the lower remuneration for qualified staff in government as opposed to the private sector as more critical than DCs. DCs believe management requires both bureaucrats and technocrats. Although international and/or regional telecommunications organizations assist LDCs to improve organizational and administrative abilities in LDCs, goals of their assistance are not fully shared by LDCs. In fact, government operators express a stronger dissatisfaction about the assistance than private operators.

**5.2.4 Characteristics of Finance-oriented Obstacles** (see Tables 4.45 and 4.46)

Sufficient financial resources are not provided for telecommunications infrastructure. There are three reasons for this. Firstly, small national budgets in LDCs restrict total investment in telecommunications. Secondly, national investment priority for telecommunications is still low. And thirdly, telecommunication service revenues are not appropriately dedicated to development of telecommunications infrastructure. Both LDCs and DCs understand that it is difficult to dedicate further capital to telecommunications investment under the current economic conditions in LDCs. The small size of the markets in LDCs is not a big concern for either LDCs and DCs. While LDCs believe that the lack of sufficient financial resources seriously prevents them from keeping up with changes in technology, DCs put a relatively low importance on this issue. One common concern between LDCs and DCs is that the funding level from bilateral and multilateral sources is greatly inadequate to narrow the gap. While LDCs seek greater and more timely aid from international and/or regional funding institutions, they also consider their continuing dependence on international and/or regional funding institutions as a critical obstacle. LDCs regard wrong pricing and poor credit control as more critical than DCs.

**5.2.5 Characteristics of Technology-oriented Obstacles** (see Tables 4.47 and 4.48)

A significant difference of appraisal between LDCs and DCs was found in two issues. The first issue is the perception of how technology transfer has been conducted and should be conducted. On one hand, LDCs regard the current practice of technology transfer as equipment and service provision-oriented. They need more knowledge-oriented technology transfer that fosters their independence. On the other hand, DCs are not so concerned about the current methods of technology transfer. The second-issue is technology selection. There are too many technological alternatives in the market for LDCs

to choose. Furthermore, technologies manufactured in DCs are geared towards the commercial interests of the manufacturers in DCs and not for the needs of LDCs.

#### **5.2.6 Characteristics of Human Resources-oriented Obstacles** (see Tables 4.49 and 4.50)

The relative scarcity of trained personnel is a critical obstacle for LDCs to build up expertise. A related problem is that a substantial amount of money is required to train personnel abroad due to the lack of adequate in-country training capability. DCs point out that corruption and nepotism are a critical obstacle that minimizes human resources development in LDCs. A significant difference of appraisal between LDCs and DCs was found as to whether or not international and/or regional telecommunications organizations collaborate in human-resources promotion.

#### **5.2.7 Characteristics of Knowledge-oriented Obstacles** (see Tables 4.51 and 4.52)

The rapid speed of technology changes and the consequent high cost of obtaining new knowledge are major obstacles for LDCs. Both LDCs and DCs agree that there is a lack of knowledgeable and impartial advice on such aspects as regulating the sector, restructuring the sector and implementing a phased program of deregulation. In addition, DCs see that LDCs lack commercial and financial expertise.

#### **5.2.8 Characteristics of Politics-oriented Obstacles** (see Tables 4.53 and 4.54)

Both LDCs and DCs agree that the lack of political stability in most LDCs makes financiers unwilling to risk their capital. They also agree that the continuing monopoly system hinders the development of telecommunications and that the politically motivated low-price supply of telecommunications services restricts the self-financing of network expansion in LDCs. The contributions of the telecommunications infrastructure to overall economic development and to the development of other sectors such as transport, agriculture, health and education are overlooked. In LDCs, there is little communication

between politicians or legislators and telecommunications operators in restructuring the telecommunications sector. It is noted that some of the conditions attached to financial assistance from international and/or regional funding institutions prevent LDCs from obtaining assistance because the conditions would bring political conflicts in LDCs.

#### **5.2.9 Characteristics of Economy-oriented Obstacles (see Table 4.55)**

Both LDCs and DCs regard as a very critical the fact that the economic situation in LDCs often forces the government to give a greater priority in allocating available resources to those services related to basic human needs (food, clothing and shelter). Another very serious issue for LDCs is that companies from DCs take the profits of telecommunications services provided in LDCs out of those countries instead of reinvesting them there. DCs either do not agree or do not think it so critical.

#### **5.2.10 Characteristics of Social System/Culture-, Geography- and Corruption-oriented Obstacles**

With regard to social system/culture-oriented obstacles, none of the six was ranked in the top 75 (see Tables 4.34, 4.35 and 4.36). Thus, it is safe to say that these obstacles are not perceived as having a significantly detrimental effect. The geography-oriented obstacle, that is, the heavy investment requirement for people in rural areas scattered throughout a wide geographical area, is regarded a more serious issue by LDCs than by DCs (see Table 4.57). Finally, LDCs and DCs agree that corruption and kick-backs are a serious problem (see also Table 4.57).

#### **5.2.11 Similarly and Differently Assessed Obstacles**

Through sections 5.2.1 to 5.2.10, it was pointed out that agreement of the assessment between LDCs and DCs was found for some obstacles and disagreement was found for others. The similarities and differences of the assessments are summarized below to better understand the perceptions of LDCs and DCs.

The obstacles to which both LDCs and DCs showed a similar assessment were as follows:

- \* LDCs are unwilling to adapt their policies and regulations to the changing environment of the telecommunications sector and insufficiently implement liberalization of the telecommunications sector (Policy and Regulation-oriented obstacle).
- \* LDCs have less open, less customer-focused, less market-oriented, less responsive and less efficient bureaucratic organizations and administrations (Organization and Administration-oriented obstacle).
- \* LDCs have difficulty in dedicating further capital to telecommunications investment under current economic conditions (Finance-oriented obstacles).
- \* The funding level from bilateral and multilateral sources to narrow the gap is greatly inadequate (Finance-oriented obstacles).
- \* Corruption and nepotism minimize human resources development in LDCs (Human Resources-oriented obstacle).
- \* There is a lack of knowledgeable and impartial advice on aspects such as regulating the sector, restructuring the sector and implementing a phased program of deregulation (Knowledge-oriented obstacle).
- \* There is a lack of political stability in most LDCs (Politics-oriented obstacle).
- \* There is a continuing monopoly system and a politically motivated low-price supply of telecommunications services (Politics-oriented obstacle).
- \* The contributions of telecommunications infrastructure to overall economic development and to development of other sectors such as transport, agriculture, health and education are overlooked (Politics-oriented obstacle).

- \* The economic situation in LDCs forces the government to give a greater priority in allocating available resources to those services related to basic human needs (food, clothing, and shelter) (Economy-oriented obstacle).
- \* There is a problem with corruption and kick-backs (Corruption-oriented obstacle).

For those obstacles which LDCs and DCs assessed differently, LDCs tended to view them as more critical than DCs. They are as follows:

- \* Policies and regulations are applied from DCs to LDCs as standards or copied by LDCs without consideration of LDCs' unique needs and conditions (Policy and Regulation-oriented obstacle).
- \* In LDCs, the remuneration for qualified staff in government organizations is lower than in the private sector (Organization and Administration-oriented obstacle).
- \* The lack of sufficient financial resources seriously prevent LDCs from keeping up with changes in technology (Finance-oriented obstacle).
- \* There are different perceptions of how technology transfer has been conducted and should be conducted between LDCs and DCs (Technology-oriented obstacle).
- \* There are too many technological alternatives in the market for LDCs to choose from and these technologies are geared not for the needs of LDCs but for the commercial interests of the manufacturers in DCs (Technology-oriented obstacle).
- \* International and/or regional telecommunications organizations usually do not collaborate in human-resources promotion (Human Resources-oriented obstacle).
- \* There is a lack of commercial and financial expertise in LDCs (This obstacle was assessed by DCs as more critical than LDCs: Knowledge-oriented obstacle).
- \* There is little communication between politicians or legislators and telecommunications operators in restructuring the telecommunications sector in LDCs (Politics-oriented obstacle).

- \* Some of the conditions attached to financial assistance from international and/or regional funding institutions result in conflicts in LDCs (Politics-oriented obstacle).
- \* LDCs lack proper planning skill, sufficient information systems and long-term oriented planning and investment (Planning and Implementation-oriented obstacle).
- \* The profits of foreign telecommunications services providers are not re-invested in LDCs (Economy-oriented obstacle).
- \* Heavy investment is required for people in rural areas scattered throughout a wide geographical area (Geography-oriented obstacle).

#### **5.2.12 Additional Observations**

Overall, LDCs gave higher scores to most obstacles across categories than DCs did. This fact indicates that LDCs are aware of the variety of existing problems and are concerned about them. Then how could the lower scores of DCs for the same obstacles be understood? Servaes states "... an outside view of a society's development may be very different from the assessment made by that society of itself" (1991, p. 73). Thus it might be difficult for DCs to share the same level of concerns as LDCs even if they have recognized the negative impacts of those obstacles. Another interpretation would be that DCs have not realized how critical those obstacles are for LDCs.

There were, however, a few issues to which DCs gave higher scores than LDCs, although differences of the assessment were not statistically significant. Firstly, DCs consider that political instability in LDCs discourages foreign investment and leads to widen the gap. Secondly, the continuing monopoly system and accompanying siphoning of telecommunications service revenues for other purposes are also considered to be highly critical. Thirdly, corruption, nepotism and kick-backs-related obstacles got higher scores from DCs. Corruption discourages DCs from coming to LDCs either for assistance or for investment. Although the issue of corruption is very sensitive and is not always openly

discussed, it should be noted that the issue was raised in the survey and assessed as quite a critical obstacle, especially by DCs. Casmir (1991) states that:

Corruption, greed, power and striving for power may not be factors we like to acknowledge or have publicly exposed, but unfortunately, they have appeared in conjunction with almost all human efforts which promised worthwhile rewards or status (p. 6).

There was one obstacle to which DCs gave a significantly higher score than LDCs. DCs strongly expressed that LDCs need to acquire more commercial, financial and market expertise and need to reduce the power of bureaucrats.

### **5.3 Assessment of Obstacle Factors and Categories of Obstacles**

#### **5.3.1 Similarly and Differently Assessed Obstacle Factors and Categories of Obstacles**

Table 5.2 summarizes the results of Table 4.67 with descriptions of all obstacle factors and categories of obstacles. It shows to which factor/category of obstacles LDCs and DCs gave a similar assessment and in which factor/category they held a different perspective.



Table 5.2

Similarly and Differently Assessed Obstacles Factors and Categories of Obstacles to Telecommunications Development

Category	Assessment	
	Not Significant Difference	Significant Difference
Policy and Regulation	<p>PRF1: Unchanged policies and regulations in LDCs.</p> <p>PRF3: High tariff in LDCs.</p> <p>PRF4: Incomplete regulatory structure in implementing liberalization policy in LDCs.</p>	<p>PRF 2: Introduced external policy and regulations that do not necessarily match special conditions of the LDCs.</p>
Organization and Administration	<p>OAF1: Unclear goals of assistance from international and/or regional telecommunications organizations.</p> <p>OAF3: Services provided not by technocrats but by bureaucrats.</p>	<p>OAF2: Low remuneration for qualified staff in government organizations.</p>
Finance	<p>FIF4: Unsatisfactory conditions for foreign investment.</p> <p>FIF5: Small financial resources to the telecommunications sector.</p>	<p>FIF1: The small market size and dependency on the DCs' resources.</p> <p>FIF2: Unsatisfactory official funding from bilateral and multilateral sources.</p> <p>FIF3: Dependence on international and/or regional funding institutions.</p> <p>FIF6: Wrong pricing and poor credit control.</p>
Technology		<p>TEF1: Selling of technology without real technology transfer.</p> <p>TEF2: Too many alternative technologies, most of which are designed for DCs' needs.</p>

Table 5.2 (Continued)

Similarly and Differently Assessed Obstacle Factors and Categories of Obstacles to Telecommunications Development

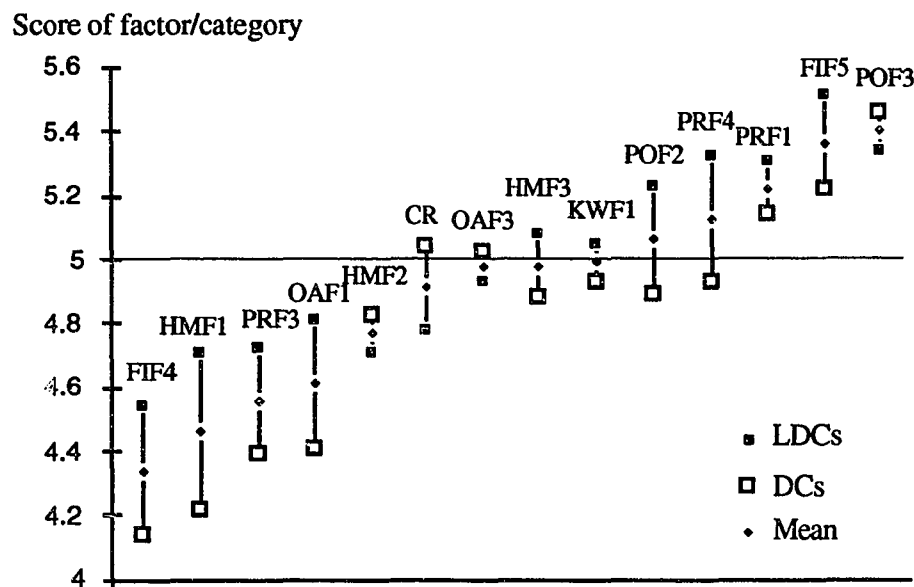
Category	Assessment	
	Not Significant Difference	Significant Difference
Human resources	HMF1: Insufficient training assistance. HMF2: Corruption and nepotism. HMF3: High staff turnover and limited in-country training facilities.	
Knowledge	KWF1: Lack of knowledgeable and impartial advice.	KWF2: Rapid technology change and high cost of obtaining new knowledge.
Politics	POF2: Lack of a holistic view about roles of telecommunications and the resulting low national priority for telecommunications development. POF3: Political instability and politicians' continuing support of monopoly system.	POF1: Little communication between politicians or legislatures and telecommunications operators.
Others	CR: Corruption	PI: Planning and Implementation EO: Economy GO: Geography SS: Social System/ Culture

On one hand, considering that both LDCs and DCs have shown similar concerns about approximately half of the obstacle factors and categories of obstacles, there will be opportunities for them to seek common strategies to tackle the problems. Especially in the category of human resources development, LDCs and DCs were consistent in their

assessments of the levels of significance of these problems. Thus, there should be harmonized strategies to overcome the problems. On the other hand, it is true that there was a similar number of obstacle factors and categories of obstacles in which the appraisal of LDCs and that of DCs were not in agreement. The problems in the policy and regulation, finance, technology and knowledge categories are not limited to LDCs and are often closely associated with DCs. The underlying reasons for such perceptual differences need to be carefully examined and clarified. Particularly, the fact that all the obstacle factors in the technology category showed different assessments indicates the need to examine, with much caution, how technology-oriented obstacles have hindered telecommunications development. This finding points out the need for further research on technology-oriented problems.

### **5.3.2 Rank Order of Similarly Assessed Obstacle Factors and Categories of Obstacles**

Figure 5.2 presents the obstacle factors and the category that are in the column of Not Significant Difference in Table 5.2. Each bar for obstacle factor or category consists of the score of LDCs at one end and the score of DCs at the other. Each bar represents the difference of the two scores, nevertheless, the difference is not statistically significant in Figure 5.2. That is, LDCs and DCs basically agreed with the level of negative impact of these factors and the category of obstacles.



**Figure 5.2.** Factors/category assessed similarly by LDCs and DCs.

Suppose that a mean score of 5.0 is set as an adequate threshold to determine if or not an obstacle factor or category is judged as highly critical, five obstacle factors from the right appear to be highly critical. Their depictions are as follows:

- POF3. Political instability and politicians' continuing support of monopoly system;
- FIF5. Small financial resources to the telecommunications sector;
- PRF1. Unchanged policies and regulations in LDCs;
- PRF4. Incomplete regulatory structure in implementing liberalization policy in LDCs; and,
- POF2. Lack of a holistic view about roles of telecommunications and the resulting low national priority.

POF2 and POF3 refer to the government and politicians' passive attitude toward the telecommunications development. PRF1 and PRF4 are interrelated in a sense that clearing PRF1 is a minimum requirement and clearing PRF4 is the next step to take. FIF5 is and

has been a very serious issue. While none of these issues can be easily resolved, it is important to note that both LDCs and DCs have shared the same level of concern about these factors' negative impacts on telecommunications development.

### 5.3.3 Rank Order of Differently Assessed Obstacle Factors and Categories of Obstacles

Figure 5.3 presents the obstacle factors and categories of obstacles that are in the column of Significant Difference in Table 5.2. Each bar for obstacle factor or category consists of the score of LDCs at one end and the score of DCs at the other. Each bar represents the difference of the two scores, and in Figure 5.3 the difference is statistically significant. That is, perspectives of LDCs and of DCs regarding the levels of negative impacts of these factors and categories were significantly different.

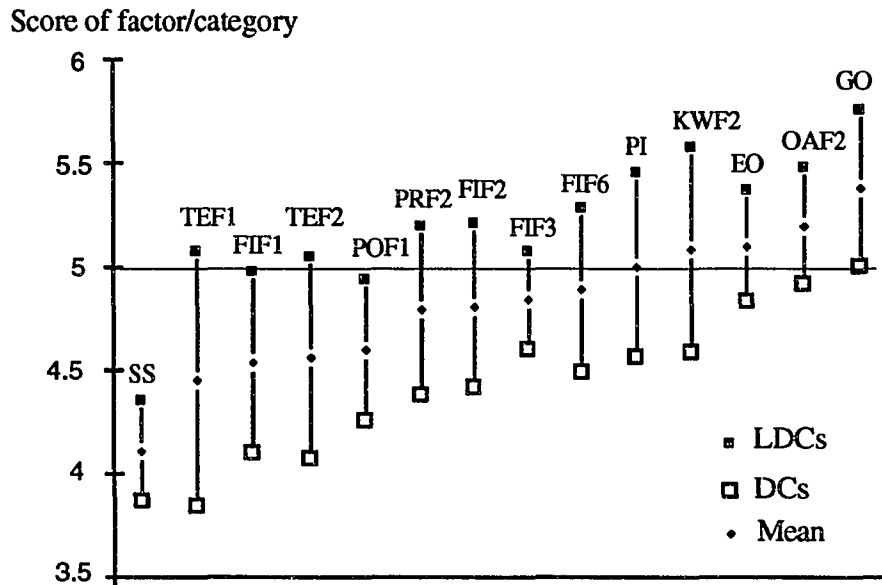


Figure 5.3. Factors/categories assessed differently by LDCs and DCs.

Again, if a mean score of 5.0 can be set as a threshold to determine if or not an obstacle factor or category is judged as highly critical, two obstacle factors and three categories from the right appear to be highly critical. Their depictions are as follows:

- GO. Geography-oriented obstacles;
- OAF2. Low remuneration for qualified staff in government organizations;
- EO. Economy-oriented obstacles;
- KWF2. Rapid technology change and high cost of obtaining new knowledge; and,
- PI. Planning and implementation-oriented obstacles.

While GO and EO are external constraints affecting the telecommunications sector, OAF2 and PI reflect the problems often found in the sector itself. KWF2 is also an external constraint in the sense that many of the LDCs have no choice other than adapting to advanced technologies developed in DCs.

#### **5.3.4 Other Findings**

One striking difference between Figure 5.2 and Figure 5.3 is that in Figure 5.3 LDCs' assessments on all obstacle factors/categories of obstacles except for POF1 and SS are higher than 5.0, whereas DCs' assessments are lower than 5.0. Thus, Figure 5.3 clearly shows the significant degree of discrepancy of perspectives existing between LDCs and DCs. Since development of telecommunications in LDCs is a common goal that will satisfy the interests of both LDCs and DCs, the existing misunderstandings about the problems should not be ignored. Before the misunderstandings are further compounded and increasingly aggravated, both LDCs and DCs need to discuss their perceptions of the problems and the strategies to overcome the problems.

#### **5.4 Future Strategies to Closing the Telecommunications Development Gap**

In Chapter 4, all suggested strategies were presented under each category of obstacle as well as under each obstacle factor. In the following section, characteristics of those

strategies will be discussed by paying due attention to which group (i.e. LDCs or DCs) provided the strategy. The strategies were grouped into current strategies and future strategies in Chapter 4. Considering that a current strategy in a country could become a future strategy for other countries, the distinction will not get much weight in the following discussion. Instead, whether or not some of those provided strategies are in fact being implemented will be explored.

#### **5.4.1 Strategies to Overcoming Policy and Regulation-oriented Obstacle Factors (PRF)**

Table 5.3 summarizes four policy and regulation-oriented obstacle factors (PRFs) and strategies to overcoming those factors.

Table 5.3

#### **Future Strategies to Overcoming Policy and Regulation-Oriented Obstacle Factors (PRF)**

Factor	Future Strategies	
	Suggested by LDCs	Suggested by DCs
PRF1: Unchanged policies and regulations in LDCs.	<ul style="list-style-type: none"> <li>* International and regional telecommunications organizations (like the ITU) should elaborate and advocate a clear policy for commercialization and liberalization and cooperate with financial institutions/private investors on policy matters.</li> <li>* Hold seminars and/or meetings on privatization.</li> </ul>	<ul style="list-style-type: none"> <li>* Hold international seminars on liberalization policies.</li> <li>* An ITU working group is looking into various regulatory and privatization models and coming up with recommendations.</li> <li>* Follow examples of other countries of similar status.</li> </ul>

Table 5.3 (Continued)

Future Strategies to Overcoming Policy and Regulation-Oriented Obstacle Factors (PRF)

Factor	Future Strategies	
	Suggested by LDCs	Suggested by DCs
PRF2 <sup>a</sup> : Introduced external policy and regulations that do not necessarily match special conditions of the LDCs.	* Avoid to copy the practices in the developed nations.	* Carry out a survey by a joint group of experts from both DCs and the developing country.
PRF3: High tariff in LDCs.	* None.	* None.
PRF4: Incomplete regulatory structure in implementing liberalization policy in LDCs.	<ul style="list-style-type: none"> <li>* Mandate an international gateway facility provider and/or a cellular mobile operator to install a certain number of local exchange lines.</li> <li>* Policy makers must ensure that new entrants fulfill their commitments.</li> <li>* The regulatory body should control the public and private companies' operation to ensure a fair competition.</li> <li>* The regulatory body should be involved in the strategic management and investment policy of a new provider and should prevent a monopoly situation.</li> <li>* The regulatory body should encourage as much local capital as possible.</li> <li>* Establish a solid regulatory body with a sound regulatory framework.</li> </ul>	<ul style="list-style-type: none"> <li>* Active participation of LDCs in the two study groups in the development sector of the ITU.</li> <li>* Establish an independent regulatory institution.</li> <li>* Give autonomy to the public telecommunications companies with regard to their budgets, investment, management, buying procedures, contracting of personnel and a tariff policy.</li> </ul>

<sup>a</sup>The assessments between LDCs and DCs were significantly different in this factor.



Concerning PRF1, high expectations exist about the role that international organizations, especially the ITU, could play in studying a variety of policy and regulatory models and providing LDCs with recommendations. Although there was no strategy identified for PRF3, the setting of adequate tariff should be included in the above-mentioned models and recommendations. Most suggestions for PRF4 address the establishment of an independent regulatory agency to facilitate the restructuring of the telecommunications sector. Some countries that established a regulatory agency during the past several years were Hong Kong (Ure, 1995a, p. 25), Tanzania (Kiula, 1994, p. 36), the Philippines (Lichauco, 1994b, p. 38), Mexico (ITU, 1994a, p. 70) and Colombia (Pisciotta, 1994, p. 30). The structure of the regulatory body and how the regulatory philosophy is implemented may vary from country to country (Pisciotta, 1994, p. 30). It is important to understand, however, that two major roles of the regulator are to establish the rules of the game and to ensure fair competition, fulfillment of operators' obligations and protection of user rights (ITU, 1994a, p. 68; Lichauco, 1994b, p. 38). Although the assessments of LDCs and of DCs about PRF2 differ, their suggested strategies point out the necessity to devise policies and regulations specific to a country's needs, whether or not outside experts are used. Malta is one successful example of improving the telecommunications infrastructure with a close partnership with the ITU (Dimech, 1994, p. 32).

#### **5.4.2 Strategies to Overcoming Planning and Implementation-oriented Obstacles**

Table 5.4 summarizes future strategies to overcoming planning and implementation-oriented obstacles.

Table 5.4

Future Strategies to Overcoming Planning and Implementation-Oriented Obstacles

Future Strategies	
Suggested by LDCs	Suggested by DCs
<ul style="list-style-type: none"> <li>* Create an office to implement the installation, operation &amp; maintenance of public telephones in every municipality in the country.</li> <li>* Have both short-term and long-term planning with coordination and continuity between related projects.</li> <li>* Plan by a centralized department rather than by different departments.</li> <li>* Conduct a feasibility study for new projects.</li> <li>* Take account of customer needs and the grade of service in any planning activity.</li> <li>* Ensure that staff is aware of the vast changes in telecommunications.</li> <li>* Shorten the time period between the study and implementation of a project.</li> </ul>	<ul style="list-style-type: none"> <li>* The least cost solution for service delivery and expansion targets based on demand for service should be the <i>modus operandi</i>.</li> <li>* Include development of the telecommunications structure as a compulsory element in any aid project.</li> <li>* Bear in mind that long term solutions might not ease short term problems.</li> <li>* Prioritize general management-related goals to improve quality of assistance.</li> </ul>

It should be understood that short-term planning is necessary to solve short-term problems and long-term planning is necessary to cope with long-term problems. Also short-term planning must be aligned with long-term planning. In terms of long-term planning, a long-term national commitment to telecommunications development is very important. For example, in Taiwan, the government stressed the development of ten industries and four of them were related to information technology and telecommunications industries. As a result, over the past ten years, the annual output of the telecommunications industry increased by 52.63% and the information industry by 574.66% (Choi, 1992, p. 5). Other examples are found in Botswana, Turkey and the Republic of Korea. They had

kept high levels of investment in the telecommunications infrastructure over a decade, and as a result, they had achieved some of the fastest growth rates of teledensity in the world (ITU, 1994a, pp. 84-87). In the case of the Republic of Korea, the strong national consensus of the strategic role of information technology, including telecommunications, was a key factor for its success (Kim, Kim, & Yoon, 1992, p. 1841).

#### **5.4.3 Strategies to Overcoming Organization and Administration-oriented Obstacle Factors (OAF)**

Table 5.5 summarizes three organization and administration-oriented obstacle factors (OAFs) and strategies to overcoming those factors.

Table 5.5

#### Future Strategies to Overcoming Organization and Administration-Oriented Obstacle Factors (OAF)

Factor	Future Strategies	
	Suggested by LDCs	Suggested by DCs
OAF1: Unclear goals of assistance from international and/or regional telecommunications organizations.	* None.	* None.

Table 5.5 (Continued)

Future Strategies to Overcoming Organization and Administration-Oriented Obstacle Factors (OAF)

Factor	Future Strategies	
	Suggested by LDCs	Suggested by DCs
OAF2 <sup>a</sup> : Low remuneration for qualified staff in government organizations.	* None.	* None.
OAF3: Services provided not by technocrats but by bureaucrats.	<ul style="list-style-type: none"> <li>* Have consultants examine areas such as regulations, laws, financial impact on government, etc..</li> <li>* Turn the operator into an independent company with complete autonomy, and then establish a good and solid regulatory body.</li> </ul>	* The regulatory body has to be set up first and then make an independent company.

<sup>a</sup>The assessments between LDCs and DCs were significantly different in this factor.

With regard to OAF3, one strategy to changing the outdated organizational culture is to turn the monopoly operator into an independent company. Although the two suggested orders of establishing an regulatory body and of turning the government operator into an independent company are contradictory, the point remains that corporatization should be conducted after a good and sound regulatory framework is established with appropriate legislation.

#### 5.4.4 Strategies to Overcoming Finance-oriented Obstacle Factors (FIF)

Table 5.6 summarizes six finance-oriented obstacle factors (FIFs) and strategies to overcoming those factors.

Table 5.6

#### Future Strategies to Overcoming Finance-Oriented Obstacle Factors (FIF)

Factor	Future Strategies	
	Suggested by LDCs	Suggested by DCs
FIF1 <sup>a</sup> : The small market size and dependency on DCs' resources.	* None.	<ul style="list-style-type: none"> <li>* Start with a BOT operation.</li> <li>* Invite foreign investment and then localize their production by technology transfer.</li> <li>* Establish a common model for convergence regionally and set up a transitional system allowing the countries to have strong collaboration.</li> <li>* The ITU can encourage groupings of countries to create critical mass/risk-spreading for potential investors/suppliers.</li> </ul>
FIF2 <sup>a</sup> : Unsatisfactory official funding level from bilateral and multilateral sources.	* Using commercial <u>off shore</u> loans.	<ul style="list-style-type: none"> <li>* Establish a global loan program.</li> <li>* Establish a voluntary organization specialized in telecommunications assistance.</li> <li>* Investment community's more proactive investment.</li> </ul>

<sup>a</sup>The assessments between LDCs and DCs were significantly different in this factor.

Table 5.6 (Continued)

Future Strategies to Overcoming Finance-Oriented Obstacle Factors (FIF)

Factor	Future Strategies	
	Suggested by LDCs	Suggested by DCs
FIF3 <sup>a</sup> : Too much dependence on international and/or regional funding institutions.	* None.	* None.
FIF4: Unsatisfactory conditions for foreign investment.	* None.	* None.
FIF5: Inadequate financial resources to the telecommunications sector.	<ul style="list-style-type: none"> <li>* Restructure the sector aiming at involvement of a private sector and foreign investors and aiming at enabling the sector to more adequately adapt to the ever changing economic environment.</li> <li>* Create a private, domestic telecommunication financing institution to mobilize funds from local institutional investors.</li> </ul>	<ul style="list-style-type: none"> <li>* Mandate the new service provider to serve both urban and rural areas.</li> <li>* Have new service providers to put part of their revenues in a <u>Development Fund</u>.</li> </ul>
FIF6 <sup>a</sup> : Wrong pricing and poor credit control.	* Readjust tariffs towards cost.	* None.

<sup>a</sup>The assessments between LDCs and DCs were significantly different in this factor.

Relating to the suggestions for FIF2, in 1995, the ITU in fact inaugurated a private sector driven multinational and development funding organization, called WorldTel, which focused exclusively on the development of telecommunications and information technology in the least developed countries. WorldTel will provide client LDCs with direct equity

investment raised from private financial investors in the world and coordinate project finance from debt and/or equity coming from governments, telecommunications operators and manufacturers. It will also help client countries improve their policies and management practices (ITU, 1995, pp. 1-4). This new initiative reflects the shift from public sector-driven development to private sector-driven development. The establishment of a similar financing institution in a country is proposed as one solution to FIF5. Considering that adequate telecommunications infrastructure and services enhance the productivity and efficiency of many other sectors such as transportation, tourism, health and education, the feasibility of this idea may be worth examining further.

The suggestions from DCs for FIF5 address the requirement of new service providers coming into the market. In the Philippines, President Ramos issued two executive mandates and one of them required that any service provider operating in a lucrative area should provide less profitable areas with a certain number of local lines (Lichauco, 1994b, p. 38). Regarding FIF1, Thailand may be a representative example to show how effectively a developing country can utilize a BTO (Build-Transfer-Operate) scheme. The strategy has brought in about US\$10 billion of private capital to telecommunications infrastructure improvement and it has especially contributed to the mobile telecommunications sector (Harrington, 1995, pp. 94-95). The above mentioned WorldTel will also make the best use of the BOT (Build-Operate-Transfer) scheme (Ras-Work, 1995).

#### **5.4.5 Strategies to Overcoming Technology-oriented Obstacle Factors (TEF)**

Table 5.7 summarizes two technology-oriented obstacle factors (TEFs) and strategies to overcoming those factors.

Table 5.7

Future Strategies to Overcoming Technology-Oriented Obstacle Factors (TEF)

Factor	Future Strategies	
	Suggested by LDCs	Suggested by DCs
TEF1 <sup>a</sup> : Selling of technology without real knowledge transfer.	<ul style="list-style-type: none"> <li>* Big international companies awarded big contracts are contractually committed to spend a certain percentage of the contract value in establishing national companies for technology transfer.</li> <li>* Technology transfer should help LDCs acquire the ability to build and manufacture their own equipment.</li> </ul>	* Opposition.
TEF2 <sup>a</sup> : Too many alternative technologies, most of which are designed for DCs' needs.	* The community's engagement by way of organized sectors such as unions and associations is the best way to find the most adequate solutions both in technical and economic terms.	* Opposition.

<sup>a</sup>The assessments between LDCs and DCs were significantly different in this factor.

Suggested strategies were split into two opposite ones. On one hand, LDCs want to build their own manufacturing capability to cope with technology-oriented obstacles and expect international companies to play some key role for this purpose. One of the strategies that have accelerated telecommunications development in Indonesia is the promotion of local industries. Indonesia is about to export telecommunications products (Parapak, 1994, pp. 40-41). On the other hand, there is pessimism about the possibility of manufacturing telecommunications equipment in LDCs. It was pointed out that many DCs do not



manufacture telecommunications equipment. Even in the Republic of Korea where their own switching technology was successfully developed and manufactured, the reality is that "It may well be the case that even South Korea can buy cheaper switches than the ones manufactured at home from highly competitive international suppliers (Kim, Kim, & Yoon, 1992, p. 1841). Thus, strategies to these two factors are mixed. Considering that both TEF1 and TEF2 were assessed differently by LDCs and DCs and no agreed strategy was found to this problem, it appears that technology-related, especially technology transfer-related obstacles and possible solutions will require more in depth scrutiny.

#### **5.4.6 Strategies to Overcoming Human Resources-oriented Obstacle Factors (HMF)**

Table 5.8 summarizes three human resources-oriented obstacle factors (HMFs) and strategies to overcoming those factors.

Table 5.8

Future Strategies to Overcoming Human Resources-Oriented Obstacle Factors (HMF)

Factor	Future Strategies	
	Suggested by LDCs	Suggested by DCs
HMF1: Insufficient training assistance.	<ul style="list-style-type: none"> <li>* Develop own institutional development programs.</li> <li>* Conduct an intense human resources training program at both technological and managerial levels.</li> </ul>	<ul style="list-style-type: none"> <li>* Train experts and staff not only in the field of technology but also in the aspects of policy and management in assistance with international organizations such as the ITU, the World Bank, etc..</li> <li>* Emphasize training in more specialized technical &amp; professional as well as executive &amp; management fields.</li> </ul>
HMF2: Corruption and nepotism.	* None.	* None.
HMF3: High staff turnover and limited in-country training facilities.	<ul style="list-style-type: none"> <li>* Bond trainees to return after completion of training overseas.</li> <li>* With the help of the ITU, an institutional development program was upgraded and a Telecommunications Training Centre was established.</li> </ul>	* None.

One common feature in the strategies to HMF1 indicates the necessity to train people not only in the technical field but also in professional, management and policy fields.

### 5.4.7 Strategies to Overcoming Knowledge-oriented Obstacle Factors (KWF)

Table 5.9 summarizes two knowledge-oriented obstacle factors (KWFs) and strategies to overcoming those factors.

Table 5.9

#### Future Strategies to Overcoming Knowledge-Oriented Obstacle Factors (KWF)

Factor	Future Strategies	
	Suggested by LDCs	Suggested by DCs
KWF1: Lack of knowledgeable and impartial advice.	* None.	* The ITU, World Bank, OECD etc. could usefully prepare a number of case studies regarding restructuring of the telecommunication sector. The case studies could be used as a basis for showing and comparing changes through several simple parameters on a spreadsheet.
KWF2 <sup>a</sup> : Rapid technology change and high cost of obtaining new knowledge.	* None.	* None.

<sup>a</sup>The assessments between LDCs and DCs were significantly different in this factor.

The DCs' strategy to KWF1 is similar to the strategies suggested in PRF1. It should be noted, however, that LDCs did not propose any strategy. The obstacles composing KWF1 seem to reflect LDCs' displeasure about the conduct of foreign companies and assistance from DCs as well as international and/or regional organizations (see Table 4.51).

Since KWF1 is the sixth critical factor in Figure 5.2, the underlying problems of this factor need to be examined carefully. In addition, since KWF2 is another critical factor, strategies to KWF2 should be sought in future research.

#### 5.4.8 Strategies to Overcoming Politics-oriented Obstacle Factors (POF)

Table 5.10 summarizes three politics-oriented obstacle factors (POFs) and strategies to overcoming those factors.

Table 5.10

#### Future Strategies to Overcoming Politics-Oriented Obstacle Factors (POF)

Factor	Future Strategies	
	Suggested by LDCs	Suggested by DCs
POF1 <sup>a</sup> : Little communication between politicians or legislators and telecommunications operators.	* None.	* None.

<sup>a</sup>The assessments between LDCs and DCs were significantly different in this factor.

Table 5.10 (Continued)

Future Strategies to Overcoming Politics-Oriented Obstacle Factors (POF)

Factor	Future Strategies	
	Suggested by LDCs	Suggested by DCs
POF2: Lack of a holistic view about the role of telecommunications and the resulting low national priority for telecommunications development.	<ul style="list-style-type: none"> <li>* Invite Ministers of Communication to attend conferences on telecommunications to learn about the issues involved.</li> <li>* Provide Ministers with information briefings on telecommunications issues.</li> </ul>	<ul style="list-style-type: none"> <li>* Let politicians know the importance of telecommunications by showing the effect of telecommunications infrastructure on economic growth with examples in DCs.</li> <li>* The ITU should sponsor a one week seminar attended by ministers of communications to convince them of the benefits of telecommunication development by reviewing success stories.</li> </ul>
POF3: Political instability and politicians' continuing support of the monopoly system.	<ul style="list-style-type: none"> <li>* Sensitize politicians to private investment as the only means to enhance development of telecommunication sector in LDCs.</li> </ul>	<ul style="list-style-type: none"> <li>* Sensitize key officials and other high level decision makers who will be around for a long time rather than politicians who are in office for a limited term.</li> <li>* More emphasis should be placed on documenting the alternative costs of current politics/priorities and policies/regulations.</li> </ul>

Regarding POF2 and POF3, all of the suggested strategies indicate the necessity of further efforts to convince politicians as well as key officials of the significant positive impacts of telecommunications development on the country. One suggestion is to show successful cases from other countries. Another is to show the potential cost of continuing

underdevelopment in the country by maintaining the status quo. Considering that the underdevelopment and/or the present slow development of telecommunications in many LDCs will not evidently bring anything beneficial to those countries, a variety of innovative approaches for changing the thinking of key people should be pursued by countries and by multilateral organizations.

#### **5.4.9 Strategies to Overcoming Geography-oriented Obstacle**

Table 5.11 summarizes suggested strategies to overcoming the geography-oriented obstacle.

Table 5.11

#### Future Strategies to Overcoming Geography-Oriented Obstacle

Future Strategies	
Suggested by LDCs	Suggested by DCs
<ul style="list-style-type: none"> <li>* Extend mobile satellite services, fixed cellular networks and wireless technologies to reach rural subscribers.</li> <li>* Satellites have a major role to play in providing communications to scattered populations in remote rural areas.</li> </ul>	<ul style="list-style-type: none"> <li>* Increase the use of small, hand-portable mobile earth stations to end the isolation of remote and rural areas in LDCs.</li> <li>* Satellites in particular have a major role to play in providing telecommunications in LDCs due to their ubiquitous coverage and ability to provide instantaneous communication links without the need for substantial investment in terrestrial infrastructure.</li> </ul>

Table 5.11 (Continued)

Future Strategies to Overcoming Geography-Oriented Obstacle

Future Strategies	
Suggested by LDCs	Suggested by DCs
	<ul style="list-style-type: none"> <li>* Develop semi-fixed analog mobile phone cells placed in communities without telecommunications, complete with cheap handsets and VSAT links to regional hubs.</li> <li>* Conduct pilot projects in selected countries to demonstrate an end to end wireless system (i.e., radio in local loop/satellite communications).</li> </ul>

Most of the strategies address further implementation of wireless technologies to overcome geographical problems and to avoid the substantial investment in terrestrial infrastructure. In fact, the growth of mobile communication is dramatic in several LDCs. Over two years from 1991 to 1993, for instance, the number of mobile subscribers increased more than nine times in China and Thailand, more than four times in Malaysia and more than two times in Indonesia and the Philippines (World Telecom, 1995, p. 66). Indonesia, composed of 17,508 islands, has used the PALAPA satellite for many years. In Africa, the feasibility of the Regional African Satellite Communication System (RASCOM) project was studied by participating African countries and the ITU. The project is now moving toward its implementation stage (ITU, 1994c, p. 12). Wireless technology is clearly the key solution to the geographical obstacle.

## CHAPTER 6. CONTRIBUTIONS OF THE STUDY

### 6.1 Contributions

A major contribution of the study is the extension of our knowledge in three important areas: the nature of the underdevelopment of telecommunications in LDCs; the obstacles that have slowed the expected advancement of telecommunications; and, possible future strategies that may be effective in overcoming the obstacles. The study investigated each of these issues comprehensively by providing a more holistic picture of each issue rather than focusing on part or a single facet of the problem. The study achieved this comprehensive analysis by incorporating a variety of viewpoints from approximately 50 countries and by elaborating those inputs in the three-round survey.

It is now clear that general development efforts with incorrect and incomplete assumptions about the problem and without clear goals cannot hope to achieve the desirable outcomes. The same holds true in telecommunications development. What is needed first is to examine the problems that many LDCs have faced and identify the critical dimensions of these problems. When the phrase telecommunications development gap had been used to reflect the problems of telecommunications development in LDCs, only a few of the dimensions of the problems had been examined. There had been no study that had analyzed comprehensively the nature of the underdevelopment. In order to fully understand the core of the problems inherent in telecommunications development in LDCs, it was necessary in the study to explore and understand the telecommunications development gap as a whole.

The study generated an analytical framework in understanding the problem of the telecommunications development gap (see Figure 5.1). The framework was derived from the survey participants' assessment of the 12 dimensions of the gap. The figure shows that the problem of the telecommunications development gap has both a quantitative and



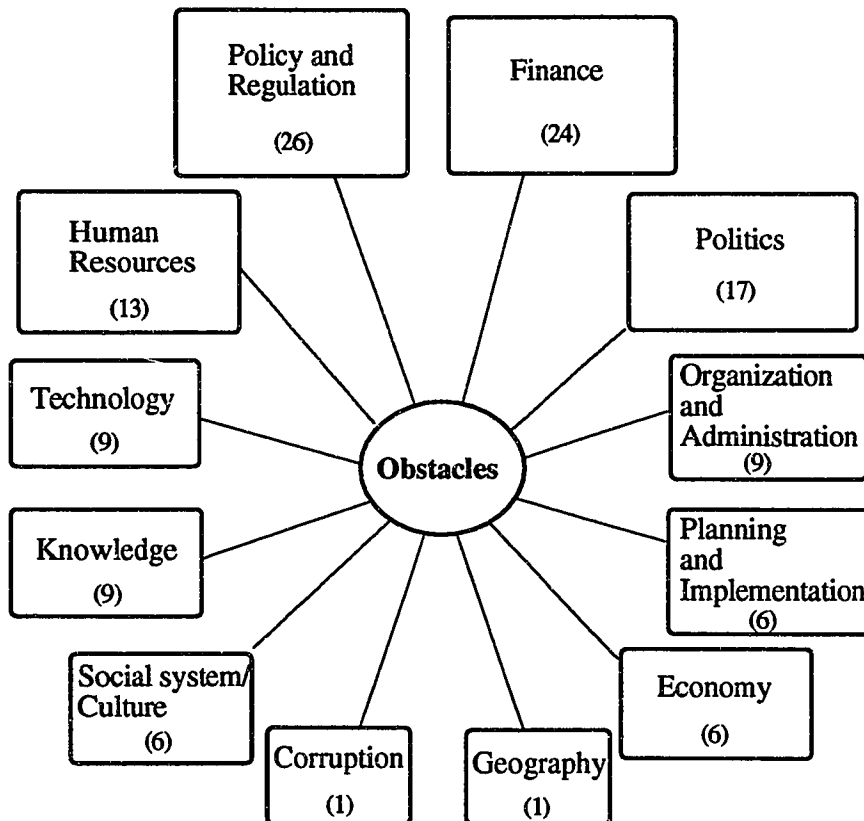
qualitative nature. It further shows that the qualitative nature of the problem is composed of impediment and consequence. Factor 3, the impediment of the gap, was found to be most critical. Thus, the crucial nature of factor 3 was emphasized. The study identified additional 13 dimensions of the gap. Many of these 13 dimensions were found to be grouped into factor 3.

These findings point out the need to clarify which factor of the telecommunications development gap is discussed or examined in a study or in a development project. In addition, they indicate that the most critical factor, the impediment of the gap (factor 3), must not be overlooked in any case.

As the label "the impediment of the gap" shows, the factor addresses many of the difficulties that LDCs have confronted in trying to narrow the gap. The study regarded these difficulties as obstacles to telecommunications development. Firstly, the study identified a total of 127 obstacles. These 127 obstacles were consolidated from initially identified 398 obstacles. Thus, the study identified the full range of 127 obstacles to advancing telecommunications in LDCs. No research had before examined the range of obstacles or provided a comprehensive framework of obstacles to narrow the telecommunications development gap.

The present study used Bernt and Weiss' (1993) four categories, regulatory, economic, organizational and technical as a framework to identify all the possible obstacles. Considering the importance of the human aspects of the problem, the researcher added knowledge and human resources as additional categories to the framework. This framework was used in the first-round survey to identify all the possible obstacles. After the responses, the researcher examined the nature of all the obstacles and found that some of the obstacles did not categorize well in the framework. At last, four additional categories were developed. The resulting comprehensive framework of obstacles consisting of 12 categories is presented in Figure 6.1. This framework categorizes the gamut of obstacles

inherent to telecommunications development in LDCs, and thus, is one of the important contributions of the study.



**Figure 6.1.** Twelve categories of the 127 obstacles.

**Note.** The value in each category represents the number of identified obstacles in the category.

If the number of obstacles in a category is regarded as one indicator of the relative importance of the category, we can see that policy and regulation, finance and politics are the most critical issues. In fact, 16 of the highly ranked top 25 obstacles are from these three categories (see Table 4.34). No past research had comprehensively categorized the variety of obstacles or examined the relative significance of each category. A better understanding of the basic nature of the problem is most certainly an important contribution of this research.

The study further analyzed each of the 12 categories and identified more than one obstacle factor in seven of the twelve categories. This means that each of the seven categories is composed of sub-elements or different types of problems. The study analyzed the assessment of LDCs and DCs about the degree of seriousness of the individual obstacles, categories of the obstacles and obstacle factors. It found both agreement and disagreement between LDCs and DCs. Very little had been earlier discovered or understood about how LDCs and DCs looked differently at the problem of telecommunications underdevelopment in LDCs.

These findings have important implications for those considering strategies to overcome these obstacles. From a harmonized perspective, there will be opportunities for LDCs and DCs to seek common strategies to tackle the individual obstacles, categories of the obstacles and obstacle factors in which both LDCs and DCs showed similar concerns. Especially in the category of human resources development, LDCs and DCs were completely consistent in their assessments of the levels of significance of these problems. Thus, there should be harmonized strategies to overcome the problems.

From a less harmonized perspective, LDCs and DCs were not in agreement in a similar number of the individual obstacles, categories of the obstacles and obstacle factors. The problems in policy and regulation, finance, technology and knowledge categories in LDCs are not limited to LDCs and are often closely associated with DCs. While the study contributed the identification, the underlying reasons for such perceptual differences need to be carefully examined and clarified. Since development of telecommunications in LDCs is a common goal that will satisfy the interests of both LDCs and DCs, the existing misunderstandings about the problems should not be ignored. Before the misunderstandings are further compounded and increasingly aggravated, both LDCs and DCs need to discuss their perceptions of the problems and the strategies to overcome the problems. Particularly, the fact that all obstacle factors in the technology category showed

different assessments indicates the need to examine, with much caution, how technology-oriented obstacles have hindered telecommunications development. This finding points out the necessity for future research on this issue.

Another contribution was the identification of a number of strategies to overcome many of the obstacle factors. Given that one obstacle factor consists of a few individual obstacles, the suggested strategy to a particular obstacle factor can be a strategy applicable to multiple obstacles. It is true that many of the strategies were narrow and would need to be adjusted on a country-by-country basis, nevertheless, it was found that some of those strategies had already been implemented in some countries. This fact implies that the other identified strategies also have a potential to work well to solve other problems. The study has provided a basis for more extensive elaboration of strategies.

## **6.2 Potential Contributions**

One potential contribution of the study was the structure and process of the three-round survey that was developed as a research method. Throughout the three rounds, the focus of the study shifted from clarifying the nature of the problem, to identifying obstacles, and to examining strategies to overcome the obstacles. This process-oriented approach will be useful for exploratory studies in which issues are elaborated extensively without the use of hypothesis testing. It provides an effective way to get an overall sense of a problem and can provide information for studies focused on specific and complex problems. For example, during the study, a former ranking member of Bangladesh Telegraph and Telephone Board contacted the researcher. The person requested the researcher to provide a copy of the three questionnaires used in the study so that he could carry out a similar study to identify problems in his country. The research method can also be applied to problems in other sectors.

Another potential contribution is the various and different ways used to analyze the data in the study. First, the nature of the telecommunications development gap was examined in terms of dimensions and was broken to three factors by Factor Analysis. Secondly the identified 127 obstacles were analyzed in a variety of ways. The degree of the negative impact of each obstacle was assessed quantitatively and presented in ranking order. A Factor Analysis was conducted for each category to logically group and narrow the obstacles. Each of the resulting 23 obstacle factors was then labeled to represent its characteristic. One-way ANOVAs were conducted on these factors and the other five categories that did not have any factor. This was to establish any significant difference of assessment of the 23 obstacle factors and five categories of the obstacles between LDCs and DCs. Thirdly, current and future strategies were examined on a factor-by-factor basis and/or category-by-category basis. In many cases multiple obstacles consolidated into an obstacle factor and then strategies for the factor were discussed. Thus, the suggested strategies will be relevant to the multiple obstacles in the factor.

In summary, the study contributed considerably toward establishing a framework for diagnosing the underdevelopment of telecommunications in LDCs and for prescribing future strategies for reducing the telecommunications development gap. In addition, the study also required the design of a useful research method that could be applied to other studies and pointed out needs for future research in specific areas.

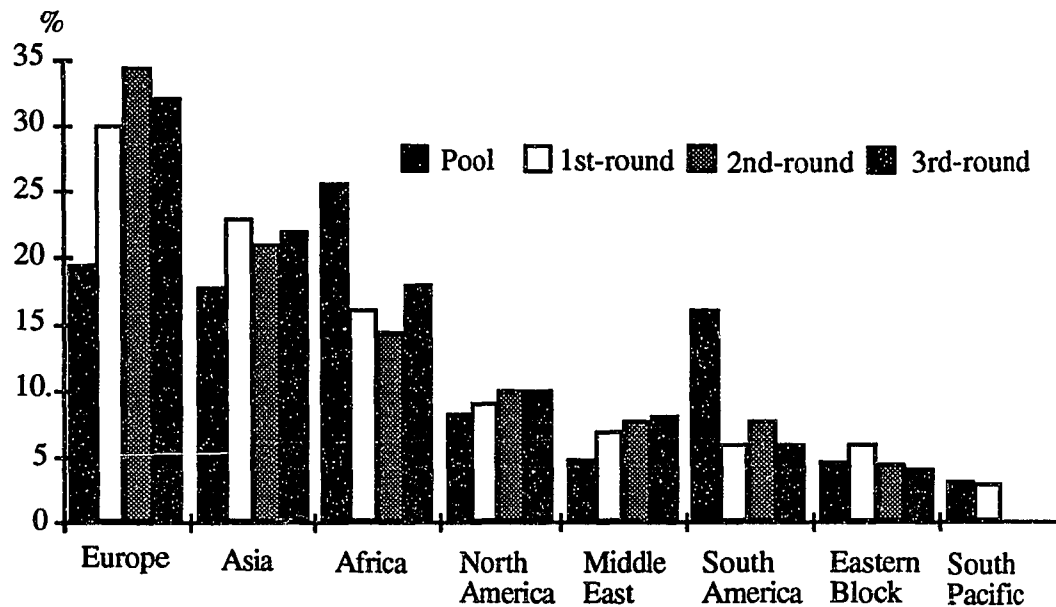
## CHAPTER 7 IMPLICATIONS OF THE STUDY

### 7.1 Possible Limitations

First, the sample population in the international survey was the delegates to the ITU Buenos Aires conference. This assumed that they were representative of the whole population in the field of telecommunications. In fact, they might not be truly representative of this population. Nevertheless, taking into account that they were the delegates to an international conference associated with telecommunications development in LDCs and that national delegates are usually heavily involved in national policy and planning in countries, it can be argued that they were eligible to serve as participants in a study that investigated the telecommunications development gap from broad perspectives. Thus, this limitation probably does not deteriorate the results of the study.

Secondly, the absolute number of responses for each round (i.e., 100, 93 and 50) might be considered too small to represent the perspectives of telecommunications professionals in the world. On one hand, this is a valid claim. On the other hand, the survey return rate for each round (i.e., 23.3, 23.0 and 53.8 %) was not so inappropriate considering that the survey was conducted internationally. In addition, Figure 7.1 presents the regional proportion of participants in the initial pool of 410 participants and regional proportions of participants in the subsequent three-round surveys. The figure shows that in most of the regions the response rate across the three rounds did not change dramatically. Therefore, the figure indicates that in spite of the small absolute number of participants the study succeeded in incorporating perspectives around the world.

Figure 7.1 shows that in Europe, Asia, North America, the Middle East and Eastern Block regions the survey response rate exceeded or was the same as the initial proportion of the region in the pool of 410 participants. In Africa, South America and South Pacific regions the survey response rate was lower than expected.



**Figure 7.1.** Regional distribution of participants in the initial pool and regional distributions of participants in subsequent three-round survey.

One possible reason for the lower than expected participation in Africa and South America may be that the survey was in English. There are many countries in these regions where English is not widely used. There was one instance during the second-round survey in which the secretary of one participant in Morocco called the researcher to inform him that the participant could not answer the questionnaire because the person did not use English. The limited universality of English might have decreased the response rate of the survey.

## 7.2 Implications

In this last section, some of the implications of the study will be discussed. The current study was a first attempt to provide a much more comprehensive framework in order to more thoroughly understand the problem of telecommunications underdevelopment in many of the LDCs.

From a theoretical point of view, the study can be expanded to three directions. One would be to refine the results of the study by involving a larger number of telecommunications professionals in the world. The second direction would be to carry out a similar study in a geographically limited targeted area such as a region or nation. In this way, the study will be able to identify problems unique to the area and to provide telecommunications professionals involved in telecommunications development in the area with a useful and constructive opportunity to work on their problems cooperatively. The third direction would be to carry out a study focusing on those countries at a similar stage of telecommunications infrastructure and service development. Toffler (1990) identifies three distinct groupings among LDCs according to their economic development (pp. 383-384). Similarly, Jamieson (1991) claims:

In many domains of modern intellectual life, implicit assumptions of uniformity or homogeneity have been discredited and largely abandoned. The discovery of an unexpected degree of variability in the systems being studied has led to a revision of theory and practice in fields. (P. 29)

Thus, a study that will not see LDCs as one coherent group of countries in the world but take into account their heterogeneity will be necessary to diagnose their unique problems and prescribe the most appropriate solutions.

In addition to the above directions, further research can be carried out to test the findings of the study in real cases. That is, the frameworks developed in the current study will be used to analyze actual conditions of selected LDCs. Several developing countries at a more advanced stage of telecommunications infrastructure and service development and several other countries at a less advanced stage will be used as cases. In the process of applying the currently developed frameworks to real cases, it is expected that the frameworks can be tailored to examine varying conditions of telecommunications development in LDCs.



In the survey, many respondents acknowledged the importance of the study and expressed their interests in learning the results. The researcher will send an executive summary of the study to the survey participants. It is hoped that the information in the summary will be further disseminated within the respondents' organizations as well as in their respective countries. The researcher will also seek ways to widely disseminate the results of the study to the international telecommunication community through international and regional organizations.

From a practical point of view, the study is likely to have significant importance toward determining future actions in narrowing the telecommunications development gap. First, whenever people concerned initiate a telecommunications development project, the distinct three factors of the telecommunications development gap help them identify targeted objectives of the project. That is, at the outset of the project, they can examine whether they will try to improve the quantitative nature of the gap (factor 1), or whether they will attempt to solve qualitative aspect of the gap (factors 2 and 3), and whether they aim at overcoming the impediments of the gap (factor 3). They can focus their investment and their endeavors on the objectives, and as a result, can implement the project more effectively. It should be noted that the most critical factor, the impediment of the gap (factor 3), must not be overlooked in any case. By making the factors of the gap explicit, the overall efficiency of the telecommunications development projects in LDCs is expected to increase.

Secondly, it is important to understand what hindrances exist for solving any kind of problem. The same holds true in narrowing the telecommunications development gap. After a targeted factor of the gap is identified, potential obstacles to efforts should be carefully examined by the people and the organizations concerned. The framework with 12 categories of obstacle and 23 obstacle factors developed in the study is of importance as a guiding tool to investigate the potential obstacles in a particular case. After certain obstacles

are identified, they need to be prioritized in accordance with the levels of their negative impacts. Through this process, it is clearer which obstacles need to be eliminated and in what order.

Thirdly, the current study presents a number of suggested future strategies for overcoming many obstacles. It was found that some of the strategies had already been implemented in some countries. Thus, in considering strategies for eliminating the obstacles identified and prioritized above, some of the suggested strategies in the study can serve as a basis for developing appropriate strategies in a particular case.

Identifying the objective of an effort, locating potential obstacles and deciding on strategies for solving the obstacles are the basic steps to solving problems effectively. In this sense, the findings of the study have significant implications for achieving more efficient telecommunications development in LDCs.

At the same time, the study clearly showed a significant degree of discrepancy of perspectives existing between LDCs and DCs. Since the development of telecommunications in LDCs is a common goal that will satisfy the interests of both LDCs and DCs, the existing misunderstandings about the problems should not be ignored. Before the misunderstandings are further compounded and increasingly aggravated, both LDCs and DCs need to discuss their perceptions of the problems and the strategies to be taken to overcome the problems.

Jamieson (1991) points out:

.... new awareness of the extent to which all perception is culture-bound and selective and all knowledge is socially produced, imperfect, and incomplete is producing deeper understanding of the idea that there are many ways of construing reality, none of them perfect. As we now realize the problematic nature of our own beliefs and values, we are learning to appreciate the potential merit of perspectives other than our own. (P. 29)

Both LDCs and DCs need to regard overall telecommunications development in the world as their joint cooperative project and to develop the most effective strategies to achieve the goal by listening and more fully understanding each other.

**APPENDIX A SUPPORTING LETTER FROM  
THE SECRETARY-GENERAL OF THE ITU**



INTERNATIONAL TELECOMMUNICATION UNION

GENERAL SECRETARIAT

Ref.: SPU/MC 0971

15 JUL. 1994

Mr Richard J Barber  
Executive Director  
Pacific Telecommunications Council  
2454 S. Beretania Street, Suite 302  
Honolulu, Hawaii 96826  
USA

Subject: Mr Ryota Ono's, Ph.D  
Dissertation

*Dick,*  
Dear Mr Barber,

I refer to your letter of 2 May concerning Mr Ryota Ono's Ph.D. research project. I have read the outline of his dissertation with interest. The topic strikes me as a challenge well worth undertaking and extremely relevant in today's context. A project to define the telecommunications gap and establish its causality with the objective of suggesting measures to narrow it is an ambitious task that is bound to be academically stimulating and at the same time have practical value for policy-makers both in the developed and developing world.

I wish Mr Ono success in his endeavour and look forward to reading his Thesis.

With regards,

*Best personal*

Yours sincerely

*Pekka*

Pekka TARJANNE  
Secretary-General

## APPENDIX B FIRST-ROUND SURVEY QUESTIONNAIRE

## University of Hawaii at Manoa

Department of Communication

1330 16th Ave., Honolulu, Hawaii 96816, USA

Telephone: +1 808-956-3346, Facsimile: +1 808-732-3050 or +1 808-956-5591

Internet: ryota@uhunix.uhcc.hawaii.edu \*\* 94 - \*\*

October 18, 1994

Dear :

I am writing to request your personal assistance in an important research project concerning the global "telecommunications gap." This research project is aimed at providing a comprehensive framework for understanding the telecommunications gap using different perspectives from around the world. This project is conducted in conjunction with the Pacific Telecommunications Council in Hawaii. We contacted the ITU and have been encouraged to conduct this project. Enclosed please find a supporting letter from the Secretary-General of the ITU.

A critical part of this research project is to get input from experienced people like you in the field of telecommunications. I am distributing this questionnaire all over the world, and you are *one of a few representatives* of your country or organization. The opinions obtained from this survey will be used solely for this research. Your name will never be associated with any particular statement or point of view, but will only appear on a list of participants.

Could you please complete the attached questionnaire? I estimate that it will take you about 20 minutes. After you are finished, please return the questionnaire by fax at +1 808-732-3050 or +1 808-956-5591, if possible, or via the self-addressed envelope. I will be grateful if you can return the questionnaire within ten days. A quick response is important due to the global nature of this international survey.

Your insights in this important area of investigation are *seriously needed* and are *sincerely appreciated*.

Thank you in advance for your assistance. I hope to hear from you soon.

Sincerely yours,

Ryota Ono  
Department of Communication  
University of Hawaii at Manoa

encl. Supporting letter

**An International Survey  
Concerning  
the Telecommunications Gap**

**First-Round**

**October 1994**

**Principal Investigator: Ryota Ono  
University of Hawaii at Manoa  
Department of Communication  
1330 16th Ave.  
Honolulu, Hawaii 96816  
U.S.A.**

Last name: \_\_\_\_\_

**Organization of the Iterative International Survey**

The iterative international survey in this research project consists of three-rounds of questionnaires. The first-round focuses on developing a common framework for defining the "telecommunications gap" and potential obstacles for closing the gap. A list of obstacles that are to be identified in the first-round will be provided to the survey participants in the second-round. In addition, the second-round will investigate current and future innovative approaches to narrowing the gap. The investigated approaches will be fed back to the participants and will be elaborated in the third-round. Since each round gathers global opinions and perspectives from a number of telecommunications experts all over the world, the feedback from the previous round should be of interest to the survey participants.

**First-round Questions**

The first-round questionnaire consists of two parts. Please read the instructions first and fill out the appropriate spaces. The definition of "telecommunications" in this study is limited to two-way, electronic wire-line and wireless communication technologies for voice and data communication. In other words, the term "telecommunications" in this study will not include one-way broadcasting. While the situation of telecommunications development in developing countries is described by using various words such as the "missing link," "disparity," "imbalance" and "gap," the word "gap" is used in this questionnaire as a composite of these words.

**PART I**

In accordance with previous research, the word "telecommunications gap" has been used to mean various elements and/or dimensions associated with telecommunications development in developing countries, as summarized in the diagram on page 2.

I-A. Please examine the diagram and then add in the spaces marked [13], [14] and [15] below some other elements and/or dimensions which are not identified but you are aware of with their definitions:

[13] \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

[14] \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

[15] \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

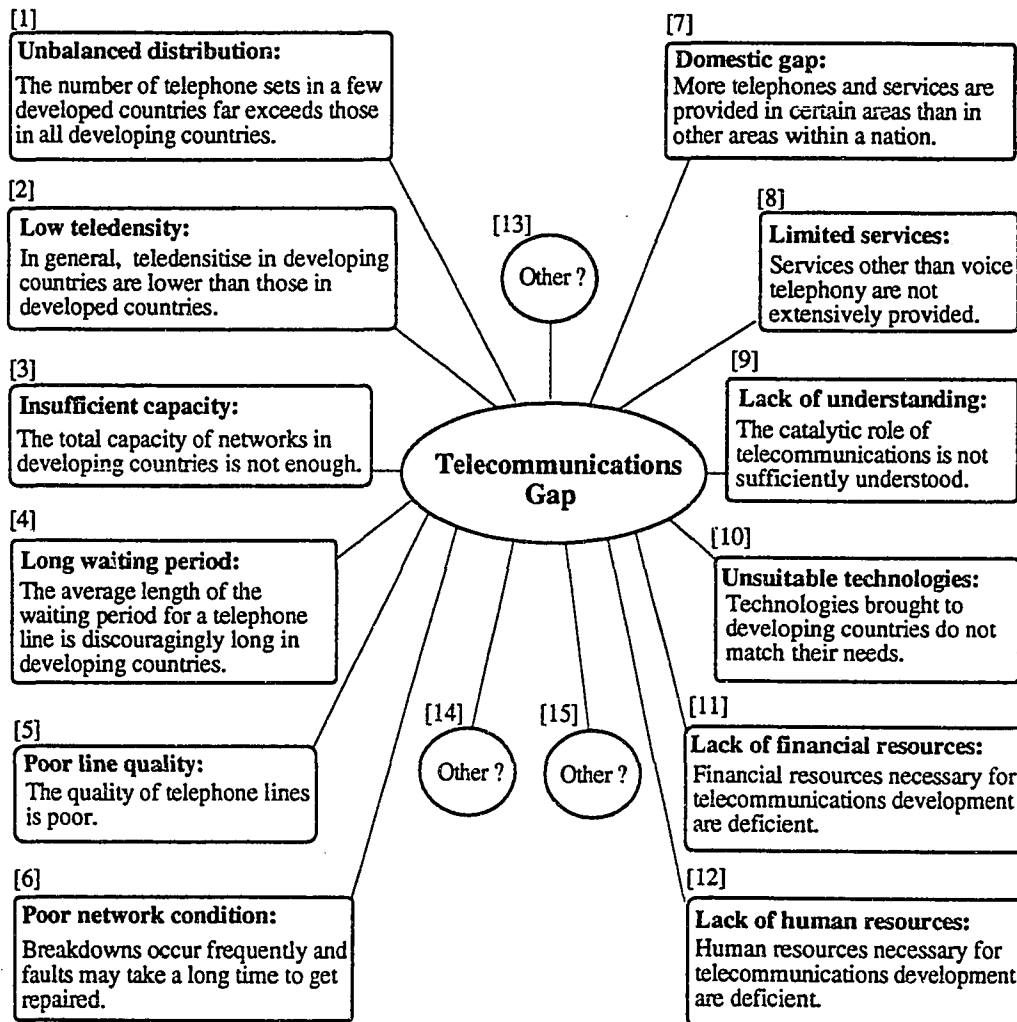
I-B. Based on your own knowledge and personal experience, please assess how important (or critical) each of the elements and/or dimensions is in discussing the "telecommunications gap":

	Not Important (Not Critical)						Very Important (Very Critical)
[1] Unbalanced distribution of telephones:	( ) 1	( ) 2	( ) 3	( ) 4	( ) 5	( ) 6	( ) 7
[2] Low teledensity:	( ) 1	( ) 2	( ) 3	( ) 4	( ) 5	( ) 6	( ) 7
[3] Insufficient capacity:	( ) 1	( ) 2	( ) 3	( ) 4	( ) 5	( ) 6	( ) 7
[4] Long waiting period:	( ) 1	( ) 2	( ) 3	( ) 4	( ) 5	( ) 6	( ) 7
[5] Poor line quality:	( ) 1	( ) 2	( ) 3	( ) 4	( ) 5	( ) 6	( ) 7
[6] Poor network condition:	( ) 1	( ) 2	( ) 3	( ) 4	( ) 5	( ) 6	( ) 7
[7] Domestic gap:	( ) 1	( ) 2	( ) 3	( ) 4	( ) 5	( ) 6	( ) 7
[8] Limited services:	( ) 1	( ) 2	( ) 3	( ) 4	( ) 5	( ) 6	( ) 7

Last name: \_\_\_\_\_

	Not Important (Not Critical)				Very Important (Very Critical)		
[9] Lack of understanding:	( ) 1	( ) 2	( ) 3	( ) 4	( ) 5	( ) 6	( ) 7
[10] Unsuitable technologies:	( ) 1	( ) 2	( ) 3	( ) 4	( ) 5	( ) 6	( ) 7
[11] Lack of financial resources:	( ) 1	( ) 2	( ) 3	( ) 4	( ) 5	( ) 6	( ) 7
[12] Lack of human resources:	( ) 1	( ) 2	( ) 3	( ) 4	( ) 5	( ) 6	( ) 7
[13] _____:	( ) 1	( ) 2	( ) 3	( ) 4	( ) 5	( ) 6	( ) 7
[14] _____:	( ) 1	( ) 2	( ) 3	( ) 4	( ) 5	( ) 6	( ) 7
[15] _____:	( ) 1	( ) 2	( ) 3	( ) 4	( ) 5	( ) 6	( ) 7

***Elements and/or Dimensions of the Telecommunications Gap and their Definitions***





Last name: \_\_\_\_\_

**PART II**

Taking into account the fact that the telecommunications gap has not yet been closed, there must be obstacles that have led to the persistency of the gap. Possible obstacles may be viewed systematically as being attributable to: "Policy and Regulation"; "Organization and Administration"; "Finance"; "Technology"; "Knowledge"; "Human resources"; "Politics" and "Economy." Additionally, different kinds of obstacles may be present in developing countries, in developed countries and at international and regional funding/aid organizations.

Please think carefully some of the key obstacles about which you have been concerned, and then write your own analysis of those obstacles. In order to focus each of the obstacles, please assign one descriptive category from the left box A ("Types of obstacles") and one from the right box B ("Origin of the obstacles") to each analysis. If you need other categories to express your own opinions and insights more accurately, feel free to add them in the appropriate box under "Other."

Descriptive Category	
A: Types of obstacles	B: Origin of the obstacles
(1) Policy and Regulation-oriented obstacles	(1) Developing countries
(2) Organization and Administration-oriented obstacles	(2) Developed countries
(3) Finance-oriented obstacles	(3) International and/or Regional Telecommunications organizations
(4) Technology-oriented obstacles	(4) International and/or Regional Funding/Aid organizations
(5) Knowledge-oriented obstacles	(5) Other 1 ( )
(6) Human resources-oriented obstacles	(6) Other 2 ( )
(7) Politics-oriented obstacles	
(8) Economy-oriented obstacles	
(9) Other 1 ( )	
(10) Other 2 ( )	

**Examples:**

**A(3) - B(2):** "The total amount of funding from developed countries is ....."

Here in this example, A(3) indicates that the type of the obstacle is **finance** and B(2) indicates that the origin is **developed countries**.

**A(4) - B(1):** "Technologies that developing countries introduce are ....."

Here in this example, A(4) indicates that the type of the obstacle is **technology** and B(1) indicates that the origin is **developing countries**.

Now, please write your analysis of key obstacles in the spaces provided below.

A( ) - B( ):

Last name: \_\_\_\_\_

A( ) - B( ):

A( ) - B( ):

A( ) - B( ):

A( ) - B( ):

Last name: \_\_\_\_\_

Please fill out and check the following questions about yourself. As promised, your name will never be associated with any of your opinions, but will be used to provide feedback to you.

( ) Mr. ( ) Mrs. ( ) Ms. ( ) Dr. ( ) Other ( )

Name (Print): First: \_\_\_\_\_ Last: \_\_\_\_\_ Middle: \_\_\_\_\_

Title: \_\_\_\_\_

Organization: \_\_\_\_\_

Address: \_\_\_\_\_

Country: \_\_\_\_\_ Postal code: \_\_\_\_\_

Telephone: \_\_\_\_\_

Facsimile (if any): \_\_\_\_\_

Internet address (if any): \_\_\_\_\_

Which most closely represents your organizational affiliation ?

- 1 ( ) Policy making  
 2 ( ) Regulation  
 3 ( ) Telecommunications operator as a part of government  
 4 ( ) Telecommunications operator owned by government but with operational autonomy  
 5 ( ) Telecommunications operator owned by both government and private entity(ies), with operational autonomy  
 6 ( ) Privately owned telecommunications operator  
 7 ( ) Private telecommunications equipment manufacturer  
 8 ( ) Multilateral funding/aid organization  
 9 ( ) Regional funding/aid organization  
 10 ( ) Bilateral funding/aid organization  
 11 ( ) Other: \_\_\_\_\_

*Thank you very much for your cooperation.*

Please ensure your last name is written at the top of each page. Please return pages 1 through 5 by facsimile, if possible, or by air mail using the enclosed return envelop.

	(Country code)	(Area code)	(Local number)
Facsimile:	1	808	732 - 3050 or
	1	808	956 - 5591

Mailing address: Ryota Ono                   \*\* \*\*  
 University of Hawaii at Manoa  
 1330 16th Ave.  
 Honolulu, Hawaii 96816  
 U.S.A.

	(Country code)	(Area code)	(Local number)
Telephone No.:	1	808	956 - 3346

Internet address: ryota@uhunix.uhcc.hawaii.edu

**APPENDIX C LIST OF COUNTRIES TO WHICH  
THE FIRST-ROUND QUESTIONNAIRE WAS SENT**

Region	Country	Region	Country
Africa	Albania	Africa	Republic of Maldives
	Republic of Benin		Mali
	Kingdom of Bhutan		Malta
	Burkina Faso		Morocco
	Republic of Burundi		Republic of Mauritius
	Republic of Cameroon		Islamic Republic of
	Cape Verde		Mauritania
	Central African Republic		Mozambique
	Chad		Namibia
	Comoros		Republic of the Niger
	Congo		Uganda
	Cote d'Ivoire		Rwandese Republic
	Djibouti		Senegal
	Gabonese Republic		Sudan
	Republic of the Gambia		Suriname
	Ghana		Swaziland
	Republic of Guinea		Tanzania
	Republic of Equatorial		Togolese Republic
	Guinea		Tunisia
	Kenya		Zambia
	Kingdom of Lesotho		Zimbabwe
	Republic of Liberia		
	Malawi		

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Region	Country	Region	Country
Asia	Bangladesh	Europe	Russian Federation
	Brunei Darussalam		Ukraine
	Cambodia		Czech Republic
	China		Australia
	Republic of Korea		Belgium
	India		Bulgaria
	Indonesia		Denmark
	Japan		Finland
	Lao People's Democratic Republic		France
	Malaysia		Germany
	Myanmar		Greece
	Nepal		Italy
	Pakistan		Netherlands
	Philippines		Norway
	Singapore		Portugal
	Sri Lanka		Spain
	Thailand		Sweden
Viet Nam	Switzerland		
	United Kingdom		
Eastern Block	Hungary		
	The Former Yugoslav Republic of Macedonia		

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Region	Country	Region	Country
Middle East	Kingdom of Saudi Arabia	South America	Argentine Republic
	Arab Republic of Egypt		Commonwealth of the
	United Arab Emirates		Bahamas
	Iran		Barbados
	Israel		Republic of Belarus
	Jordan		Brazil
	Kuwait		Chile
	Sultanate of Oman		Cyprus
North America	Canada	Colombia	
	Mexico	El Salvador	
	United States	Ecuador	
		Honduras	
South Pacific	Australia	Panama	
	Fiji	Paraguay	
	Republic of Kiribati	Peru	
	Papua New Guinea	Republic of San Marino	
	Western Samoa	Uruguay	
	Tuvalu	Venezuela	
		Trinite-et-Tobago	
	Dominican Republic		

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## APPENDIX D SECOND-ROUND SURVEY QUESTIONNAIRE

**University of Hawaii at Manoa****Department of Communication**

1330 16th Ave., Honolulu, Hawaii 96816, USA

Telephone: +1 808-956-3346, Facsimile: +1 808-732-3050 or +1 808-956-5591

Internet: ryota@uhunix.uhcc.hawaii.edu \*\* \*\*

November 24, 1994

Dear :

The first-round of the international survey concerning the "telecommunications gap" is now complete and the results represent a broad range of concerns from 50 countries. This welcomed cooperation has made it possible to proceed with the next stage of the research project.

The first-round contributions led to the development of the enclosed second-round questionnaire. I hope that you will find the variety of perspectives regarding the obstacles that have prevented the telecommunications gap from being closed interesting. As you read through the enclosed questionnaire, would you please answer part I, II, and III? Your insights in this important area of investigation are seriously needed and are sincerely appreciated. I estimate that it will take you about 30 minutes.

After you are finished, please return the questionnaire *by fax* to +1 808 732 3050 or +1 808 956 5591, if possible, or by air mail. I would be grateful if you could return the questionnaire *within ten days* after you receive this letter. A quick response is important due to the global nature of this survey.

As my gratitude for your participation in this second-round, I will send you *a complete summary* of the research findings when the research is completed.

Thank you in advance for your assistance. I hope to hear from you soon.

Sincerely yours,

Ryota Ono  
Department of Communication  
University of Hawaii at Manoa

encl. Supporting letter from Secretary-General of the ITU

**An International Survey  
Concerning  
the Telecommunications Gap**

**Second-Round**

**November 1994**

**Principal Investigator: Ryota Ono  
University of Hawaii at Manoa  
Department of Communication  
1330 16th Ave.  
Honolulu, Hawaii 96816  
U.S.A.**

**Facsimile: + 1 808 732 3050 or +1 808 956 5591**



### Organization of the Iterative International Survey

The iterative international survey in this research project consists of three-rounds of questionnaires. The first-round focused on developing a common framework for defining the "telecommunications gap" and potential obstacles for closing the gap. A list of obstacles identified in the first-round is provided to the survey participants in this second-round. In addition, the second-round will investigate current and future innovative approaches to narrowing the gap. Those approaches will be fed back to the participants and will be elaborated in the third-round. Since each round gathers global opinions and perspectives from a number of telecommunications experts all over the world, the feedback from the previous round should be of interest to the survey participants.

### Second-round Questions

The second-round questionnaire consists of three parts. Please read the instructions first and fill out the appropriate spaces. The definition of "telecommunications" in this study is limited to two-way, electronic wire-line and wireless communication technologies for voice and data communication. In other words, the term "telecommunications" in this study will not include one-way broadcasting.

### PART I

A number of identified obstacles are summarized according to categories from section A through section L. In each section, please read through all obstacles first, and then assess how critical each obstacle is to the endeavor of narrowing the telecommunications development gap by circling one number of the given scale from 1 to 7. It is not necessary, that '7' in section A is equivalent to '7' in section B. In other words, please be sure that your rating criteria is consistent only within each section.

Please be sure that you read through all 26 items first and that your rating criteria is consistent within Section A.

(1)

No.	Section A. Policy and Regulation-oriented obstacles	Not Critical	Very Critical
1	Monopoly of telecommunications services in some developing countries leads to a slow investment in telecommunications.	1	2 3 4 5 6 7
2	In developing countries policy changes have not taken place in concert with technological changes and customer needs.	1	2 3 4 5 6 7
3	In developing countries policies hinder the introduction of competition and prevent regulation from being separated from operation of telecommunications services.	1	2 3 4 5 6 7
4	In developing countries there is a lack of rational liberalization policies.	1	2 3 4 5 6 7
5	Despite liberalizing their telecommunications sector, some developing countries have not been very successful in creating a regulatory body at arm's length from the incumbent operator and this has created some problems for new entrants to compete in what was supposed to be a level playing field.	1	2 3 4 5 6 7
6	Developing countries simply copy the policies and regulations of developed countries without consideration of differences in conditions.	1	2 3 4 5 6 7
7	Developed countries use their own policy and regulation (i.e., deregulation) as a standard and apply them to developing countries which may be at different stages of development.	1	2 3 4 5 6 7
8	Policy and regulation of telecommunications are often imposed by international and/or regional funding organizations.	1	2 3 4 5 6 7
9	International and/or regional telecommunication organizations do not take into account the fact telecommunications infrastructure and needs for development vary substantially from one country to another.	1	2 3 4 5 6 7
10	Policy and regulation from international and/or regional telecommunication organizations sometimes do not consider local customs, cultures and idiosyncrasies.	1	2 3 4 5 6 7

11	<b>A premature introduction of extensive competition in developing countries can limit the capacity of the incumbent telecommunication operators from meeting their universal service obligation.</b>	<b>Not Critical</b>										<b>Very Critical</b>
		1	2	3	4	5	6	7				
12	<b>In some developing countries, privatization is introduced without competition and/or appropriate regulations.</b>	1	2	3	4	5	6	7				
13	<b>Policies and regulations in some developing countries deter the development of value added services.</b>	1	2	3	4	5	6	7				
14	<b>In some developing countries the message of the "Missing Link" is not fully appreciated. Lip service is given to the concept, whilst in practice it is a relatively low national priority.</b>	1	2	3	4	5	6	7				
15	<b>The high call charges are a contributing factor to the slow telecommunications growth.</b>	1	2	3	4	5	6	7				
16	<b>The high rentals of telecommunications equipment are a contributing factor to the slow telecommunications growth.</b>	1	2	3	4	5	6	7				
17	<b>Developing countries are very slow in opening their telecommunication markets to national and international operators.</b>	1	2	3	4	5	6	7				
18	<b>Policy and regulation in developing countries have not allowed the telecommunications service industry to be organized and developed as an efficient, cost-based, commercial organization, able to attract high quality staff and capital from commercial resources.</b>	1	2	3	4	5	6	7				
19	<b>In developing countries the goal of public policies in the field of telecommunications is very often not to decrease the gap but to regulate the development of the sector.</b>	1	2	3	4	5	6	7				
20	<b>In some developing countries separation of postal service and telecommunications service is not implemented.</b>	1	2	3	4	5	6	7				
21	<b>International and/or regional telecommunications organizations do not involve themselves enough in national development policies of developing countries. As a result, less effective, micro-development policies are created.</b>	1	2	3	4	5	6	7				
22	<b>While developed countries (e.g. European Community) are taking their time in studying and implementing changes, developing countries are being pushed to privatize quickly.</b>	1	2	3	4	5	6	7				
23	<b>Policies and regulations in developing countries are bureaucratic and often counter-productive.</b>	1	2	3	4	5	6	7				
24	<b>In developing countries there is a concern about privatization - concern of loss of sovereignty over telecommunication which is an important tool of social and economic development.</b>	1	2	3	4	5	6	7				
25	<b>The obligation to serve high-cost customers is an obstacle in developing countries.</b>	1	2	3	4	5	6	7				
26	<b>The aid policy in developed countries gives low priority to telecommunications development.</b>	1	2	3	4	5	6	7				

Please be sure that you read through all six items first and that your rating criteria is consistent within Section B.

(2)

No.	Section B. Planning and Implementation-oriented obstacles	Not Critical										Very Critical
1	<b>Because of lack of dialogue between users and service providers in developing countries, service providers fail to offer appropriate services to users and users cannot convey their own needs.</b>	1	2	3	4	5	6	7				
2	<b>Some developing countries have poor capacity to evaluate data about traffic and needs.</b>	1	2	3	4	5	6	7				

3	<b>Improper planning in developing countries results in inefficient use of existing resources and waste of investments.</b>	Not Critical										Very Critical
		1	2	3	4	5	6	7				
4	<b>Low information systems development results in poor response time to customer requests.</b>											
		1	2	3	4	5	6	7				
5	<b>Developing countries lack long-term oriented planning and/or investment.</b>											
		1	2	3	4	5	6	7				
6	<b>Developed countries and funding/aid organizations do not use long-term oriented planning in assisting developing countries.</b>											
		1	2	3	4	5	6	7				

*Please be sure that you read through all nine items first and that your rating criteria is consistent within Section C.*

(3)

No.	Section C. Organization and Administration-oriented obstacles	Not Critical										Very Critical
1	<b>Government control means that there is lack of autonomy for the operators in terms of: a) investments and borrowing; b) recruitment and retrenchment; c) salaries; d) tariff setting; and e) purchases.</b>	1	2	3	4	5	6	7				
2	<b>Remuneration for qualified staff in government organizations in developing countries is very low, compared to the private sector.</b>	1	2	3	4	5	6	7				
3	<b>Uncoordinated development work among different utility providers and property developers add to costs and lead to unnecessary delays in network construction.</b>	1	2	3	4	5	6	7				
4	<b>Organization and administration in developed countries are more open, customer-focused, market-oriented and very responsive. Whereas organization and administration in developing countries, under the pressure to build up the telecommunications infrastructure, tend to be more bureaucratic and rigid.</b>	1	2	3	4	5	6	7				
5	<b>Inefficiency within the operator and/or the authorities is a result of "red tape" and a less service minded approach toward the subscribers.</b>	1	2	3	4	5	6	7				
6	<b>In many developing countries telecommunications services are not professionally managed because in several cases they are headed by bureaucrats rather than by technocrats.</b>	1	2	3	4	5	6	7				
7	<b>While everyone agrees that the ITU must play a catalytic role to stimulate telecommunications development and bridge the "gap," it is not clear as to what this really means in practice and how the ITU should share the load with the wider ITU family.</b>	1	2	3	4	5	6	7				
8	<b>Administrations in international and/or regional telecommunications organizations are more concerned about their self-preservation.</b>	1	2	3	4	5	6	7				
9	<b>International and/or regional telecommunications organizations have not helped enough developing countries to establish modern organization and management of the local operators.</b>	1	2	3	4	5	6	7				

*Please be sure that you read through all 24 items first and that your rating criteria is consistent within section D.*

(4)

No.	Section D. Finance-oriented obstacles	Not Critical										Very Critical
1	<b>The heavy investment required to provide the basic infrastructure to the whole country, which is the priority in many developing countries, prevents telecommunications services from being a highly profitable business.</b>	1	2	3	4	5	6	7				
2	<b>The governments or monopoly telecommunications operators do not have the financial resources to put in the basic infrastructure.</b>	1	2	3	4	5	6	7				
3	<b>The focus of the governments or monopoly telecommunications operators is to provide services to more profitable areas, where less investment is required rather than in rural areas.</b>	1	2	3	4	5	6	7				

		Not					Very	
		Critical					Critical	
		1	2	3	4	5	6	7
4	Financing of major development projects depends very much on international and/or regional funding institutions.							
5	A local market base is too small for suppliers to thrive in developing countries.	1	2	3	4	5	6	7
6	Wrong pricing affects the ability of PTTs to generate sufficient funds for network development.	1	2	3	4	5	6	7
7	Poor credit control affects the ability of PTTs to generate sufficient funds for network development.	1	2	3	4	5	6	7
8	The lack of sufficient financial resources in developing countries does not allow them to keep up with changes in technology.	1	2	3	4	5	6	7
9	To reduce the gap, most developing countries must accelerate telecommunications network growth from 3 to 4 per cent per year to around 10 per cent. This will require devoting at least 1 to 2 per cent of GNP to telecommunications investment. This demand for capital will obviously tax all available resources.	1	2	3	4	5	6	7
10	Telecommunication service revenues in developing countries are not dedicated to development of telecommunications.	1	2	3	4	5	6	7
11	Small national budgets in developing countries restrict total investment in telecommunications, even if priority is given to telecommunications.	1	2	3	4	5	6	7
12	National investment priority for telecommunications in developing countries is low.	1	2	3	4	5	6	7
13	There is no security for the foreign private sector for recovering investments in developing countries.	1	2	3	4	5	6	7
14	Developing countries have no other choice besides depending on developed countries forever. This is because developed countries control, through loans/grants, the kinds of technology, human resource development and knowledge that developing countries receive.	1	2	3	4	5	6	7
15	Funding coming from bilateral and multilateral sources is often slow in responding to developing countries' needs.	1	2	3	4	5	6	7
16	International and/or regional funding organizations are putting tough conditions on loans to force privatization. That is, no change means no funds.	1	2	3	4	5	6	7
17	Funding coming from bilateral and multilateral sources often attach conditions that have little to do with the economics of telecommunications.	1	2	3	4	5	6	7
18	The funding level from bilateral and multilateral sources is greatly inadequate to narrow the gap.	1	2	3	4	5	6	7
19	Manufacturing investment in developing countries with low market volumes is not profitable enough for foreign investors.	1	2	3	4	5	6	7
20	Developing countries focus on their own needs at the expense of foreign investors' needs.	1	2	3	4	5	6	7
21	Funding from international and/or regional funding organizations to the telecommunications sector is only about 2% of their total allocations.	1	2	3	4	5	6	7
22	International and/or regional funding organizations regard commercial loans more appropriate than official loans for telecommunications development in developing countries.	1	2	3	4	5	6	7
23	Since international and/or regional funding/aid organizations put higher priorities on other sectors such as health, water, food and roads than on the telecommunications sector, requirements in the telecommunications sector cannot be met.	1	2	3	4	5	6	7

24	The funding/aid organizations cannot see clearly the recovery of their investments in projects carried out in developing countries.	1	2	3	4	5	6	7
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Please be sure that you read through all nine items first and that your rating criteria is consistent within section E.

(5)

No.	Section E. Technology-oriented obstacles	Not Critical						Very Critical
1	Technologies are changing too fast for developing countries to apply them economically to their systems.	1	2	3	4	5	6	7
2	Developed countries do not provide developing countries with the most advanced technology offered in the market.	1	2	3	4	5	6	7
3	The diversity of technological alternatives in the market makes it difficult for some administrations in developing countries to choose the technology best suited to their requirements.	1	2	3	4	5	6	7
4	The technology being developed in developed countries is geared towards the commercial interests of the manufacturers and the needs of developed countries. For instance, the technology offered by developed countries often is inappropriate for requirements such as low traffic, rural plain communications, easy implementation, and easy use and maintenance.	1	2	3	4	5	6	7
5	Western industry is often willing to sell equipment, technology and services, but less willing to help developing countries build or manufacture their own equipment.	1	2	3	4	5	6	7
6	Developed countries push technology driven programs too much.	1	2	3	4	5	6	7
7	Manufacturers in developed countries sometimes sell old technology.	1	2	3	4	5	6	7
8	There is a gap of understanding and practice of "technology transfer" between developed and developing countries. Developed countries usually regard it as "turn-key" commercial sales; developing countries also need knowledge and information. This problem fosters their dependence.	1	2	3	4	5	6	7
9	International and regional funding/aid organizations' aid is tied to certain telecommunications equipment.	1	2	3	4	5	6	7

Please be sure that you read through all 13 items first and that your rating criteria is consistent within section F.

(6)

No.	Section F. Human resources-oriented obstacles	Not Critical						Very Critical
1	Training facilities, in-house or in country, are limited and in many cases it is required to send personnel abroad for training. As a result, a substantial amount of income has to be diverted to human resource development.	1	2	3	4	5	6	7
2	Training and training facilities are not adequately supplied by developed countries.	1	2	3	4	5	6	7
3	High staff turnover is a problem in developing countries with strong economic growth. Given the relative scarcity of trained personnel to start with, this environment makes it difficult to plan for continuity and the build up of expertise.	1	2	3	4	5	6	7
4	Developing countries' professionals often do not return to their country of origin for various reasons.	1	2	3	4	5	6	7

5	Education and training aid from international and/or regional telecommunications organizations is insufficient.	Not Critical							Very Critical
		1	2	3	4	5	6	7	
6	Corruption and nepotism minimizes efficiency and the optimal use of human resources.	1	2	3	4	5	6	7	
7	Inadequate educational systems and facilities as well as a lack of interest in higher education hinder efforts to develop human resources in developing countries.	1	2	3	4	5	6	7	
8	Developing countries do not emphasize education and training. Inevitably the offers and funds from developed countries to help in this area are ignored, wasted, or not even used.	1	2	3	4	5	6	7	
9	The development of human resources and the development of competence are jeopardized by the lack of institutional development programs.	1	2	3	4	5	6	7	
10	Sponsorship for human resource development activities has been classified into two categories: 1) Least developed countries and 2) Non-least developed countries (non-LDC). This division has caused some developing countries classified as non-LDC to lag behind in human resource development due to lack of funds to sponsor their nationals.	1	2	3	4	5	6	7	
11	International and/or regional telecommunications organizations usually do not collaborate in human resource promotion.	1	2	3	4	5	6	7	
12	International and/or regional telecommunications organizations have not helped enough developing countries to set up regional training centers, possibly with branches in different countries.	1	2	3	4	5	6	7	
13	Tied assistance for human resource development fails to encourage developing countries to be independent and self sustaining.	1	2	3	4	5	6	7	

Please be sure that you read through all nine items first and that your rating criteria is consistent within section G.

(7)

No.	Section G. Knowledge-oriented obstacles	Not Critical							Very Critical
1	There is a lack of knowledgeable and disinterested advice on various aspects of developing and operating public telecommunication networks. This includes issues such as regulating the sector, implementing a phased program of deregulation, and restructuring, including the introduction of competition.	1	2	3	4	5	6	7	
2	When high-technology is implemented, training needs are often neglected.	1	2	3	4	5	6	7	
3	The cost of obtaining knowledge is very high due to rapid technology changes.	1	2	3	4	5	6	7	
4	Due to rapid technology changes, current knowledge in developing countries becomes obsolete quickly.	1	2	3	4	5	6	7	
5	Foreign companies in developing countries often want only to make quick money. They want to sell equipment and forget about the knowledge needed for use and maintenance.	1	2	3	4	5	6	7	
6	Understandably, developed countries do not easily share their expertise and advanced knowledge with developing countries.	1	2	3	4	5	6	7	
7	International and/or regional telecommunications organizations have not paid sufficient attention to the lack of knowledge concerning market mechanisms in developing countries.	1	2	3	4	5	6	7	
8	The international and regional telecommunications organizations have not been effective in convincing ministers in developing countries who are responsible for such sectors as finance, development, industry, public safety and health, that becoming a developed country requires developed communications.	1	2	3	4	5	6	7	

9	Developing countries lack commercial and financial experts such as accountants, lawyers and marketing experts.	1	2	3	4	5	6	7
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Please be sure that you read through all 17 items first and that your rating criteria is consistent within section H.

No.	Section H. Politics-oriented obstacles	(8)						
		Not Critical			Very Critical			
1	The lack of political stability in most developing countries widens the gap because financiers are not willing to risk their finance in unstable countries.	1	2	3	4	5	6	7
2	PTTs have no apparent willingness to develop services quickly or in accordance with the wishes of their customers.	1	2	3	4	5	6	7
3	In developing countries, there is little communication between politicians or legislators and telecommunications operators in restructuring the telecommunications sector.	1	2	3	4	5	6	7
4	In some developing countries the political will prefers one-way broadcasting to two-way telecommunications.	1	2	3	4	5	6	7
5	Generally at the beginning stage of industrialization, telecommunications is not given political support.	1	2	3	4	5	6	7
6	In developing countries, politicians are more inclined toward visible results. Usually, telecommunications facilities are regarded as an invisible result.	1	2	3	4	5	6	7
7	Self-financing of network expansion in developing countries is severely restricted by politically motivated low-price supply of telecommunications services.	1	2	3	4	5	6	7
8	Many politicians don't understand that if they abolish the monopoly system and allow for strong foreign cash flow in new private companies, their countries will rapidly benefit from much better telecommunications services.	1	2	3	4	5	6	7
9	For many reasons, but often in large part a rejection of colonial approaches, politics in developing countries has generally focused on social and command economies, rather than economic and market mechanisms focused on facilitating private business growth.	1	2	3	4	5	6	7
10	Even if an efficient telecommunications infrastructure is one of the most important prerequisites for the development of an economy and for the development of other areas such as transport, agriculture, health and education, telecommunications tend to be looked at in isolation.	1	2	3	4	5	6	7
11	There is a low national priority on telecommunication infrastructure compared to other infrastructures.	1	2	3	4	5	6	7
12	Political constraints in developing countries make it extremely difficult to improve productivity and efficiency in operations; for example, retrenchment of excess staff is rarely considered practicable because it can erode established vote banks; and unpopular measures stimulate reactions from trade unions.	1	2	3	4	5	6	7
13	Politicians are more concerned about the possibility that uncontrolled access to telecommunications (information) could eventually jeopardize the stability of existing political power structures.	1	2	3	4	5	6	7
14	The available financial resources are preferably invested into military or other consumptive fields rather than into building up telecommunications infrastructure.	1	2	3	4	5	6	7
15	Due to political influence, telecommunications network distribution may not necessarily serve public demands appropriately.	1	2	3	4	5	6	7
16	Financing from funding/aid organizations is often difficult to get as a result of rather stiff terms which sometimes involve political considerations (e.g., democratization, restructuring of the sector in more liberal and commercial terms and sometimes outright demands for complete privatization).	1	2	3	4	5	6	7

17	Funding/aid organizations are indirectly (that is behind the scene) tying development and humanitarian aid to local or national politics.	1	2	3	4	5	6	7
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Please be sure that you read through all six items first and that your rating criteria is consistent within section I.

(9)

No.	Section I. Economy-oriented obstacles	Not Critical							Very Critical						
1	The economies of developing countries do not allow them to invest much in the development of their telecommunications networks.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
2	The economic situation in developing countries often forces the government to give a greater priority, in allocating available resources, to those services related to the basic needs (food, clothing, and shelter).	1	2	3	4	5	6	7	1	2	3	4	5	6	7
3	Because of low per capita income in developing countries, it is difficult to justify investments in telecommunications.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
4	Companies of developed countries prefer to take profits of telecommunications services provided in developing countries out of those countries instead of reinvesting it there.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
5	Poor roads and inadequate power supplies add to costs and hamper operations.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
6	Slow industrialization in developing countries does not produce much demand for communication and does not facilitate manufacturing of telecommunications equipment/systems.	1	2	3	4	5	6	7	1	2	3	4	5	6	7

Please be sure that you read through all items first and that your rating criteria is consistent within each section.

(10)

No.	Section J. Geography-oriented obstacles	Not Critical							Very Critical						
1	In many developing countries, the rural life style of people scattered throughout a wide geographical area results in the requirement for very heavy investment to give service to very small numbers of people. This is not commercially justifiable and presents a huge burden for the operator.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
No.	Section K. Social System/Culture-oriented obstacles														
1	Illiterate citizens find it difficult to use telephones as they cannot independently operate the telephone.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
2	The concept of the economies of 'time' is not fully appreciated in developing countries. People do not care about 'time' and don't understand how telecommunications can save time.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
3	In some developing countries, people prefer communications in person to communications through telecommunications media.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
4	Telephone services are provided only to certain types of people such as government officials, the army, and the rich.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
5	Telecommunications projects, being quite technical, have not been able to obtain adequate community participation.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
6	Due to low income level, the local community cannot effectively participate in the ownership and management of the telecommunications infrastructure.	1	2	3	4	5	6	7	1	2	3	4	5	6	7
No.	Section L. Corruption-oriented obstacles														
1	Corruption and kick-backs are still a serious problem and often hinders change.	1	2	3	4	5	6	7	1	2	3	4	5	6	7



**PART II.**

Now that you have examined all the obstacles, please select the single obstacle that you believe most seriously hinders telecommunication development in developing countries. Then, if you know of any current approach to overcome that obstacle, please write it in Section A on this page. If you do not know of an existing approach or you do not think that the current approach is effective enough, please suggest an innovative approach that might serve to cope with that obstacle in section B on this page.

The category of the most serious obstacle is:

Section (please circle)	(A, B, C, D, E, F, G, H, I, J, K, L)
Item No. within the selected section	( )

A. Current approach(es): (please type, if possible)

B. Innovative approach(es): (please type, if possible)

**PART III**

Please answer following questions by circling one number of the given scale from 1 to 7.

	How would you rate the <u>overall level of development</u> of 1 through 8 in the <u>telecommunication sector</u> in the country in which you now reside?	Low						High
1	Policy and Regulation	1	2	3	4	5	6	7
2	Planning and Implementation	1	2	3	4	5	6	7
3	Organization and Administration	1	2	3	4	5	6	7

4	Finance	Low High						
		1	2	3	4	5	6	7
5	Technology	1	2	3	4	5	6	7
6	Human resources	1	2	3	4	5	6	7
7	Politics	1	2	3	4	5	6	7
8	How would you rate the overall level of Knowledge in the telecommunication sector in the country in which you now reside?	1	2	3	4	5	6	7
9	How would you rate the overall level of development of Economy in the country in which you now reside?	1	2	3	4	5	6	7
10	How would you rate the overall level of Geographical constraint on development of the telecommunication sector in the country in which you now reside?	1	2	3	4	5	6	7

Please fill out and check the following questions about yourself. As promised, *your name will never be associated with any of your opinions*. It will be used to provide feedback to you only.

Name (Print): ( ) Mr. ( ) Mrs. ( ) Ms. ( ) Dr. First: \_\_\_\_\_ Last: \_\_\_\_\_

Title: \_\_\_\_\_

Organization: \_\_\_\_\_

Address: \_\_\_\_\_

Country: \_\_\_\_\_

Telephone: \_\_\_\_\_ Facsimile: \_\_\_\_\_

Which most closely represents your organizational affiliation ?

- |   |   |
|---|---|
| 1 ( ) Policy making   | 6 ( ) Privately owned telecommunications operator       |
| 2 ( ) Regulation  | 7 ( ) Private telecommunications equipment manufacturer |
| 3 ( ) Telecommunications operator as a part of government   | 8 ( ) Multilateral funding/aid organization             |
| 4 ( ) Telecommunications operator owned by government but with operational autonomy                           | 9 ( ) Regional funding/aid organization                 |
| 5 ( ) Telecommunications operator owned by both government and private entity(ies), with operational autonomy | 10 ( ) Bilateral funding/aid organization               |
|   | 11 ( ) Other: _____                                     |

**Thank you very much for your cooperation.**

Please return pages 1 through 10 by facsimile, if possible, or by air mail.

Facsimile: +1 808 732 3050 or  
+1 808 956 5591 (an alternate fax machine)

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**APPENDIX E THIRD-ROUND SURVEY QUESTIONNAIRE****International Fax Transmission**

\*\* \*\*

February 8, 1995

Total 8 pages including this cover page.

**To:****Subject:** Final-round of the telecommunications gap survey

Dear :

Thank you for your contribution to the second-round of the international survey concerning the "telecommunications gap." The results represent a broad range of perspectives from 45 countries. This welcomed cooperation has made it possible to proceed with the *final stage* of the research project.

The second-round contributions led to the development of the attached final-round questionnaire. I hope that some of the *results* interest you. As you have already answered quite a few questions, would you please answer *only two questions* in this round? Your perspectives and feedback are seriously needed and are sincerely appreciated. I estimate that it will take you about 20 minutes.

After you are finished, please return the questionnaire *by facsimile* to +1 808 732 3050 or +1 808 956 5591, if possible, or by air mail. I would be grateful if you could return the questionnaire *before the end of February*. A quick response is important due to the global nature of this survey.

Thank you in advance for your assistance. I hope that you will be interested in receiving final results of this research project when it is completed.

Sincerely yours,

Ryota Ono  
University of Hawaii at Manoa  
Department of Communication  
1330 16th Ave., Honolulu, Hawaii 96816, USA  
Facsimile: +1 808 732 3050 or +1 808 956 5591  
Telephone: +1 808 956 3346  
Internet: ryota@uhunix.uhcc.hawaii.edu

Attachment: An International Survey concerning the Telecommunications Gap (Final-round)

**An International Survey Concerning the Telecommunications Gap**  
**Final-Round**  
**February 1995**

The final-round questionnaire will ask you two questions. Both questions are concerned with how we could tackle the problem of the telecommunications gap. Your answer sheets are attached as page 6 and 7.

**Question 1**

The Maitland Commission's "Missing Link" informed the world of the status of telecommunications development in many developing countries and provided us with several recommendations to ease these undesirable conditions. Please describe, in the space provided on page 6, what you believe are the most important actions that have been taken by your organization or in your country to close the telecommunications gap since 1984.

**Question 2**

The results of the second-round survey are attached from page 1 through page 5. They consist of highly ranked obstacles, current approaches and future solutions. Please review them first. From the entire survey, please select only one or two of the approaches/solutions that you would like to elaborate on or to argue about, and then present your opinions in the space provided on page 6. If you feel there are other approaches/solutions that deserve discussions and have not been addressed in this survey, please feel free to include them in the space provided on page 7.

**The results of the second-round survey**

*Section A Planning and Implementation-oriented obstacles*

**Top two highly ranked obstacles:**

- |  |
|--|
| 1st. <b>Improper planning</b> in developing countries results in inefficient use of existing resources and waste of investments. |
| 2nd. Developing countries lack long-term oriented planning and/or investment.  |

**Current approaches:** no examples provided

**Future solutions:** no examples provided

*Section B Organization & Administration-oriented obstacles*

**Top two highly ranked obstacles:**

- |  |
|--|
| 1st. Government control means that there is lack of autonomy for the operators in terms of: a) investments and borrowing; b) recruitment and retrenchment; c) salaries; d) tariff setting; and e) purchases.   |
| 2nd. Organization and administration in developed countries are more open, customer-focused, market-oriented and very responsive. Whereas organization and administration in developing countries, under the pressure to build up the telecommunications infrastructure, tend to be more bureaucratic and rigid. |

**Current approaches:**

- |   |
|---|
| C1. Consultants are being engaged to look into areas such as regulations, laws, financial impact on government, etc., before final submission to Cabinet for corporatization. When the department is corporatized, we can control and upgrade investments, borrowing, recruitment and retrenchment, salaries, tariff setting and purchases. |
|---|

**Future solutions:**

- |   |
|---|
| F1. Turn the operator into an independent company with complete autonomy, and then establish a good and solid regulatory body to control the company's operation and liberalize the market. |
|---|

*Section C Policy & Regulations-oriented obstacles*

**Top two highly ranked obstacles:**

- |  |
|--|
| 1st. In developing countries policy changes have not taken place in concert with technological changes and customer needs. |
| 2nd. Policies and regulations in developing countries are bureaucratic and often counter-productive.                       |

**Current approaches:**

- |   |
|---|
| <p>C1. As a result of ongoing deregulation and liberalization trends throughout the world, many developing countries are gradually making policy changes to open up their economic sector, and in particular, their telecommunications sector. This will significantly assist those countries in building their telecommunications industry and meeting their customers' needs which will, in turn, foster investment and economic growth.</p> <p>C2. The ITU's ongoing effort to close the "telecommunications gap" is heightening worldwide awareness of the need to do much more in this crucial area.</p> <p>C3. The ITU has established two study groups within its development sector, whose tasks will be to formulate policy, regulatory, strategy guidelines and recommendations for developing countries. Active participation by as many countries, especially developing countries, and the "small m" members (i.e., private corporations actively participating in the ITU's activities ) offers excellent opportunity for developing countries to obtain good advice about how to get it right.</p> <p>C4. Follow examples of other countries of similar status that have deregulated and are operating as cost-based commercial organizations.</p> <p>C5. The GATT and APEC Bogor declaration will push policies and regulations in developing countries to be transparent, productive and efficient.</p> <p>C6. Current approach for Philippine government's policy-making (DOTC) and regulating (NTC) agencies, is itself innovative, e.g., to allow entry of all private telecommunications operators, duly enfranchised by Congress, to establish local exchange services in assigned regional service areas; in addition, certain operators are allowed to establish toll exchange services and IGF (International Gateway Facility) and/or cellular mobile phone networks, on condition of establishing specified number of fixed/wired local telephone subscriber lines. This approach is being taken against the industry background of having an existing dominant telecommunications carrier (PLDT with about 85% domestic telephone systems), a government-operated system (TELOF) and a number of small independent telecos (PAPELCO).</p> |
|---|

**Future solutions:**

- |  |
|--|
| <p>F1. Formation of a Rural Telecommunications Policy which defines clearly specific targets and their timelines and the mechanics and the resources, i.e., technology and funding to enable fulfillment of targets set.</p> <p>F2. Development of the telecommunications structure has to be a compulsory element in any project financed by international or national organizations in aid programs to the developing countries.</p> |
|--|

*Section D Technology-oriented obstacles*

**Top two highly ranked obstacles:**

- |  |
|--|
| <p>1st. There is a gap of understanding and practice of "technology transfer" between developed and developing countries. Developed countries usually regard it as "turn-key" commercial sales; developing countries also need knowledge and information. This problem fosters their dependence.</p> <p>2nd. Western industry is often willing to sell equipment, technology and services, but less willing to help developing countries build or manufacture their own equipment.</p> |
|--|

**Current approaches:** no examples provided

**Future solutions:**

- |   |
|---|
| <p>F1. Developed countries must help developing countries to build or manufacture their own equipment, and in return, these countries with assistance of funding organizations will set up a long term contract to buy new knowledge.</p> |
|---|

*Section E Finance-oriented obstacles*

**Top two highly ranked obstacles:**

- 1st. Telecommunication service revenues in developing countries are not dedicated to development of telecommunications.
- 2nd. To reduce the gap, most developing countries must accelerate telecommunications network growth from 3 to 4 per cent per year to around 10 per cent. This will require devoting at least 1 to 2 per cent of GNP to telecommunications investment. This demand for capital will obviously tax all available resources.

**Current approaches:**

- C1. Development of telecommunication in our country has been in most cases supported by external funding assistance. The development therefore can be delayed through delays in the availability of funds. Funding assistance normally cover the costs for feasibility studies or consultancies, supply of equipment, training and technical assistance where necessary.
- C2. Mandating that new service providers serve both urban and rural areas
- C3. Creation of government controlled or owned corporations with doubtful financial (pseudo) autonomy.
- C4. Liberalization and finally privatization.
- C5. The use of commercial "off shore" loans as an alternative to bilateral or multilateral funding solves the problem of speed of approval, but may increase the cost of capital to a certain extent.
- C6. Gradual adjustment in prices and revenue balancing
- C7. BOT or BTO
- C8. International credits
- C9. Restructuring of the sector aiming at the participation of private sector and foreign investors to the funding of infrastructure of telecommunications. Such orientation has to be adapted to the specific condition of individual country, such as economic development, existing infrastructure, geographical conditions, socio-cultural elements, etc.

**Future solutions:**

- F1. Rollover credits guaranteed by settlements
- F2. Funding institutions must ease conditions to grant loans for the purpose of establishing basic telecommunications infrastructure in developing countries. The fact that globalization of telecommunications is inseparable from the globalization of economic activity must be recognized. Efforts on international, regional and national levels are required on this domain.
- F3. Global loan program needed to provide funds.
- F4. Encourage private investments through the reorganization of the sector and by using policy to direct investment into the sector. Such a reorganization, which must not necessarily mean privatization, will enable the sector to more adequately adapt to the ever changing economic environment.
- F5. Creation of a private domestic telecommunication financing institution to mobilize funds from local institutional investors such as pension funds, insurance firms, banks, etc. This institution will be guaranteed an interest rate on their finances. When the time is ripe for private equity participation, the loan can be converted to equity (preference, shares).
- F6. To increase size of the national budget, it may be necessary to help local industries to expand their turnover and employment. An initial step may be to invite foreign investment, then to localize their production by technology transfer.
- F7. Updated telecommunications law as a framework, first privatization process, then .....
- F8. One could see an opportunity in the globalization trend of various telecommunications operators. Perhaps they could invest and market services in developing countries under government regulations control.
- F9. A regional approach could offer new perspectives and help to reduce the gap in the shorter term. Two key aspects regards: a) establishment of a common "model for convergence" acceptable by each partner; and b) a transitional system allowing countries to have strong collaboration even if individually they are at a different stage of restructuring process. Such an approach developed by the European Union since 1986 could be helpful not only for specific areas of economic integration but also for developing countries and for countries with small markets.

*Section F Human resources-oriented obstacles*

**Top two highly ranked obstacles:**

- 1st. High staff turnover is a problem in developing countries with strong economic growth. Given the relative scarcity of trained personnel to start with, this environment makes it difficult to plan for continuity and the build up of expertise.
- 2nd. Developing countries' professionals often do not return to their country of origin for various reasons.

**Current approaches:**

- C1. More in-country oriented and better coordinated training programs are being encouraged.
- C2. Bonding trainees to return after completion of training overseas.
- C3. Government is emphasizing importance of human resources development in more technical fields.

**Future solutions:**

- F1. To develop our own institutional development programs
- F2. Better training programs jointly coordinated by government and donors.
- F3. Fewer strings attached to donor-supported training programs.
- F4. Encourage training in more specialized technical/professional fields.

*Section G Knowledge-oriented obstacles*

**Top two highly ranked obstacles:**

- 1st. There is a lack of knowledgeable and impartial advice on various aspects of developing and operating public telecommunication networks. This includes issues such as regulating the sector, implementing a phased program of deregulation, and restructuring, including the introduction of competition.
- 2nd. Foreign companies in developing countries often want only to make quick money. They want to sell equipment and forget about the knowledge needed for use and maintenance.

**Current approaches:**

- C1. Ministers are attending international conferences and learning about other successful development approaches in other countries.

**Future solutions:**

- F1. Objective advice based on extensive case studies & modeling
- F2. The ITU sponsored seminar (one week) attended by ministers of communications (and country rulers, if feasible): objectives 1) convince participants of the benefits of telecommunication development, 2) review country success stories (cases given by ministers and/or heads of state).

*Section H Geography-oriented obstacles*

**Obstacle:**

1. In many developing countries, the rural life style of people scattered throughout a wide geographical area results in the requirement for very heavy investment to give service to very small numbers of people. This is not commercially justifiable and presents a huge burden for the operator.

**Current approaches:**

- C1. Mobile satellite services, fixed cellular networks
- C2. Use of wireless technologies to reach rural subscribers
- C3. Satellites in particular have a major role to play in providing telecommunications in developing countries due to their ubiquitous coverage and ability to provide instantaneous communication links without the need for substantial investment in terrestrial infrastructure.
- C4. Community involvement in infrastructure installation in return for lower phone bills.

**Future solutions:**

- F1. Semi-fixed analog mobile phone cells placed in communities without telecommunications, complete with cheap handsets and a VSAT link to a regional hubs (i.e., personal low-cost telephony)

*Section I Politics-oriented obstacles*

**Top two highly ranked obstacles:**

- 1st. **The lack of political stability** in most developing countries widens the gap because financiers are not willing to risk their finance in unstable countries.
- 2nd. **Many politicians don't understand** that if they abolish the monopoly system and allow for strong foreign cash flow in new private companies, their countries will rapidly benefit from much better telecommunications services.

**Current approaches:**

- C1. Let the politicians know the importance of telecommunications: show the effect of telecommunications infrastructure on economic growth by example in developed countries.
- C2. **Recent experience**, for example, in Eastern Europe with respect to the role of communications in putting pressure on governments/policies lends hope.
- C3. **Invite Minister of Communication** to attend conferences on telecommunications and learn about the issues involved. (However, most times the Minister does not attend.) Continue to provide information briefs on telecommunications issues.
- C4. **Sensitize politicians** to private investment as the only means to enhance development of telecommunication sector in developing countries (especially in rural areas).

**Future solutions:**

- F1. More emphasis should be placed on documenting the alternative costs of current politics/priorities and policies/regulations, i.e., the costs of lost-opportunities; for example, political instability, military expenditure, etc. The fact of the matter is, however, that there are enormously strong vested interests.
- F2. **Seminars and meetings** organized by money lenders and international and regional organizations on privatization topics and/or how private investment promote global telecommunication development in developing countries.
- F3. International and regional telecommunications organizations (like ITU) should: 1) elaborate a clear policy for commercialization/liberalization dedicated to developing countries; 2) intensify efforts to advocate this policy to the political establishment in developing countries; and 3) cooperate with financial institutions/private investors on policy matters.

*Section J Economy-oriented obstacles*

**Top two highly ranked obstacles:**

- 1st. The economic situation in developing countries often forces the government to give a greater priority, in allocating available resources, to those services related to the basic needs (food, clothing, and shelter).

**Current approaches:** no examples provided

**Future solutions:** no examples provided

*Section K Corruption-oriented obstacles*

**Obstacle:**

1. **Corruption and kick-backs** are still a serious problem and often hinders change.

**Current approaches:** no examples provided

**Future solutions:** no examples provided

*Section L Social System/Culture-oriented obstacles*

**Obstacle:**

1. The concept of the economies of 'time' is not fully appreciated in developing countries. People do not care about 'time' and don't understand how telecommunications can save time.

**Current approaches:** no examples provided

**Future solutions:** no examples provided



**Answer Sheet for the Final-round Survey**  
**(Please return Only page 6 & 7)**

To: Ryota Ono \*\* \*\*  
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 Facsimile: +1 808 732 3050 (an alternate fax machine: +1 808 956 5591)

From : Name: \_\_\_\_\_ Country: \_\_\_\_\_  
 (Your name will never be associated with your responses.)

**Answer for question 1:**

**Answer for question 2:**

(Please circle appropriate letters and write the number of the selected approach/solution.)

**Example:** Section ( A, B, C, D, E, F, G, H, I, J, K, L ) - ( Current or Future ) - No. ( )

**2-1: Comments on the selected current approaches and/or future solutions:**

Section ( A, B, C, D, E, F, G, H, I, J, K, L ) - ( Current or Future ) - No. ( )

Section ( A, B, C, D, E, F, G, H, I, J, K, L ) - ( Current or Future ) - No. ( )

**2-2: Current approaches and/or future solutions that deserve discussions and have not been addressed in the survey:**

Section ( A, B, C, D, E, F, G, H, I, J, K, L ) - ( Current or Future )

Section ( A, B, C, D, E, F, G, H, I, J, K, L ) - ( Current or Future )

***Thank you very much for your cooperation.***

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## APPENDIX I RANKED 127 OBSTACLES

Table I

Descriptions of Ranked 127 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
1	5.83	1.11	po1	<b>The lack of political stability</b> in most developing countries widens the gap because financiers are not willing to risk their finance in unstable countries.
2	5.65	1.41	fi10	Telecommunication service <b>revenues</b> in developing countries <b>are not dedicated</b> to development of telecommunications.
3	5.56	1.20	eo2	The economic situation in developing countries often <b>forces the government to give a greater priority</b> , in allocating available resources, to those services related to <b>the basic needs</b> (food, clothing, and shelter).
4	5.53	1.17	pr23	Policies and regulations in developing countries are <b>bureaucratic</b> and often <b>counter-productive</b> .
5	5.53	1.44	oa1	Government control means that there is <b>lack of autonomy for the operators</b> in terms of: a) investments and borrowing; b) recruitment and retrenchment; c) salaries; d) tariff setting; and e) purchases.
6	5.50	1.19	eo1	The economies of developing countries do <b>not allow</b> them to <b>invest much</b> in the development of their telecommunications networks.
7	5.43	1.37	fi9	To reduce the gap, most developing countries must accelerate telecommunications network growth from 3 to 4 per cent per year to around 10 per cent. This will require devoting at least 1 to 2 per cent of GNP to telecommunications investment. <b>This demand</b> for capital will obviously <b>tax all available resources</b> .

Table I (Continued)

Descriptions of Ranked 127 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
8	5.42	1.49	po8	<b>Many politicians don't understand</b> that if they abolish the monopoly system and allow for strong foreign cash flow in new private companies, <b>their countries will rapidly benefit</b> from much better telecommunications services.
9	5.39	1.33	kw1	There is a <b>lack of knowledgeable and disinterested advice</b> on various aspects of developing and operating public telecommunication networks. This includes issues such as regulating the sector, implementing a phased program of deregulation, and restructuring, including the introduction of competition.
10	5.38	1.30	pr2	In developing countries <b>policy changes have not taken place</b> in concert with technological changes and customer needs.
11	5.37	1.28	pr18	<b>Policy and regulation</b> in developing countries have <b>not allowed</b> the telecommunications service industry to be organized and developed as an <b>efficient, cost-based, commercial organization</b> , able to attract high quality staff and capital from commercial resources.
12	5.36	1.23	pi3	<b>Improper planning</b> in developing countries results in inefficient use of existing resources and waste of investments.
13	5.36	1.49	go1	In many developing countries, the rural life style of people scattered throughout a wide geographical area results in the requirement for very heavy investment to give service to very small numbers of people. This is <b>not commercially justifiable</b> and presents a <b>huge burden for the operator</b> .

Table I (Continued)

Descriptions of Ranked 127 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
14	5.34	1.21	oa4	Organization and administration in developed countries are more open, customer-focused, market-oriented and very responsive. Whereas organization and administration in developing countries, under the pressure to build up the telecommunications infrastructure, tend to be <b>more bureaucratic and rigid.</b>
15	5.27	1.21	pr12	In some developing countries, <b>privatization is introduced without competition and/or appropriate regulations.</b>
16	5.27	1.35	po7	<b>Self-financing</b> of network expansion in developing countries is severely restricted by <b>politically motivated low-price supply</b> of telecommunications services.
17	5.26	1.26	po10	Even if an efficient <b>telecommunications</b> infrastructure is one of the most important <b>prerequisites</b> for the development of an economy and for the development of other areas such as transport, agriculture, health and education, telecommunications tend to <b>be looked at in isolation.</b>
18	5.25	1.46	fi8	<b>The lack</b> of sufficient financial resources in developing countries <b>does not allow them to keep up with changes in technology.</b>
19	5.23	1.25	pr24	In developing countries <b>there is a concern about privatization - concern of loss of sovereignty</b> over telecommunication which is an important tool of social and economic development.
20	5.22	1.17	oa5	Inefficiency within the operator and/or authority organizations is a result of <b>"red tape" and a less service minded approach</b> toward the subscribers.
21	5.21	1.34	pr4	In developing countries there is a <b>lack of rational liberalization policies.</b>

Table I (Continued)

Descriptions of Ranked 127 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
22	5.18	1.44	fi11	<b>Small national budgets</b> in developing countries <b>restrict total investment</b> in telecommunications, even if priority is given to telecommunications.
23	5.18	1.67	fi2	The governments or monopoly telecommunications operators <b>do not have the financial resources</b> to put in the basic infrastructure.
24	5.17	1.42	pr3	In developing countries <b>policies hinder</b> the introduction of competition and <b>prevent</b> regulation from being separated from the operation of telecommunications services.
25	5.17	1.42	pi5	Developing countries <b>lack long-term oriented</b> planning and/or investment.
26	5.16	1.35	hm6	<b>Corruption and nepotism</b> minimizes efficiency and the optimal use of human resources.
27	5.16	1.45	te8	<b>There is a gap of understanding and practice of "technology transfer"</b> between developed and developing countries. Developed countries usually regard it as "turn-key" commercial sales; developing countries also need knowledge and information. This problem fosters their dependence.
28	5.15	1.31	kw3	<b>The cost of obtaining knowledge is very high</b> due to rapid technology changes.
29	5.15	1.40	fi12	<b>National investment priority</b> for telecommunications in developing countries is <b>low</b> .
30	5.14	1.33	po9	For many reasons, but often in large part a rejection of colonial approaches, <b>politics</b> in developing countries <b>has generally focused</b> on social and command economies, <b>rather than economic and market mechanisms</b> focused on facilitating private business growth.

Table I (Continued)

Descriptions of Ranked 127 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
31	5.13	1.45	fi18	<b>The funding level from bilateral and multilateral sources is greatly inadequate</b> to narrow the gap.
32	5.11	1.36	hm3	<b>High staff turnover</b> is a problem in developing countries with strong economic growth. Given the relative scarcity of trained personnel to start with, this environment makes it difficult to plan for continuity and the build up of expertise.
33	5.08	1.39	kw5	Foreign companies in developing countries often want only to make quick money. They want to sell <b>equipment and forget about the knowledge</b> needed for use and maintenance.
34	5.08	1.50	pr1	<b>Monopoly</b> of telecommunications services in some developing countries <b>leads to a slow investment</b> in telecommunications.
35	5.06	1.38	po11	The telecommunication infrastructure has a <b>low national priority</b> compared to other infrastructures.
36	5.01	1.44	fi4	<b>Financing</b> of major development projects <b>depends very much on international and/or regional funding institutions.</b>
37	5.01	1.44	eo4	Companies of developed countries prefer to <b>take profits</b> of telecommunications services provided in developing countries <b>out of those countries</b> instead of reinvesting it there.
38	5.00	1.45	kw9	Developing countries <b>lack commercial and financial experts</b> such as accountants, lawyers and marketing experts.
39	4.99	1.39	fi6	<b>Wrong pricing</b> affects the ability of PTTs to generate sufficient funds for network development.



Table I (Continued)

Descriptions of Ranked 127 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
40	4.98	1.27	po5	Generally at the beginning stage of industrialization, telecommunications <b>is not given political support.</b>
41	4.98	1.39	oa6	In many developing countries telecommunications services are not professionally managed because in several cases they are <b>headed by bureaucrats rather than by technocrats.</b>
42	4.98	1.43	hm4	Developing countries' professionals often do <b>not return to their country</b> of origin for various reasons.
43	4.98	1.44	pr5	Despite liberalizing their telecommunications sector, some developing countries <b>have not been very successful in creating a regulatory body at arm's length</b> from the incumbent operator and this has created some problems for new entrants to compete in what was supposed to be a level playing field.
44	4.98	1.47	po14	The available <b>financial resources</b> are preferably <b>invested into military or other consumptive fields</b> rather than into building up telecommunications infrastructure.
45	4.98	1.60	oa2	<b>Remuneration</b> for qualified staff in government organizations in developing countries <b>is very low</b> , compared to the private sector.
46	4.96	1.32	eo6	<b>Slow industrialization</b> in developing countries <b>does not produce much demand</b> for communication and <b>does not facilitate manufacturing</b> of telecommunications equipment/systems.
47	4.94	1.25	pr19	In developing countries <b>the goal</b> of public policies in the field of telecommunications is very often <b>not to decrease the gap but to regulate the development</b> of the sector.

Table I (Continued)

Descriptions of Ranked 127 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
48	4.94	1.38	po3	In developing countries, there is <b>little communication between politicians or legislators and telecommunications operators</b> in restructuring the telecommunications sector.
49	4.94	1.49	kw2	When high-technology is implemented, <b>training needs are often neglected.</b>
50	4.93	1.31	kw7	International and/or regional telecommunications organizations <b>have not paid sufficient attention to the lack of knowledge concerning market mechanisms</b> in developing countries.
51	4.93	1.40	po6	In developing countries, <b>politicians are more inclined toward visible results.</b> Usually, telecommunications facilities are regarded as an invisible result.
52	4.92	1.50	kw4	Due to rapid technology changes, <b>current knowledge in developing countries becomes obsolete quickly.</b>
53	4.92	1.61	cr1	<b>Corruption and kick-backs</b> are still a serious problem and often <b>hinder change.</b>
54	4.91	1.47	pi4	<b>Low information systems</b> development results in poor response time to customer requests.
55	4.91	1.49	pi2	Some developing countries have <b>poor capacity to evaluate data</b> about traffic and needs.
56	4.89	1.45	pi6	Developed countries and funding/aid agencies <b>do not use long-term oriented planning</b> in assisting developing countries.
57	4.88	1.53	hm1	<b>Training facilities, in-house or in country, are limited</b> and in many cases it is required to send personnel abroad for training. As a result, a substantial amount of income has to be diverted to human resource development.

Table I (Continued)

Descriptions of Ranked 127 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
58	4.87	1.54	pr11	<b>A premature introduction of extensive competition</b> in developing countries can limit the capacity of the incumbent telecommunication operators from meeting their universal service obligation.
59	4.87	1.66	fi13	There is <b>no security</b> for the foreign private sector for <b>recovering investments</b> in developing countries.
60	4.86	1.30	pr14	In some developing countries <b>the message of the "Missing Link" is not fully appreciated</b> . Lip service is given to the concept, whilst in practice it is a relatively low national priority.
61	4.86	1.37	po12	<b>Political constraints</b> in LDCs hamper improvements in operational productivity and efficiency; for example, retrenchment of excess staff is rarely considered practicable because it can erode established vote banks; and unpopular measures stimulate reactions from trade unions.
62	4.85	1.54	eo5	<b>Poor roads and inadequate power supplies</b> add to costs and hamper operations.
63	4.84	1.55	oa3	<b>Uncoordinated development work</b> among different utility providers and property developers add to costs and lead to unnecessary delays in network construction.
64	4.83	1.41	hm9	The development of human resources and the development of competence are jeopardized by <b>the lack of institutional development programs</b> .
65	4.83	1.42	eo3	<b>Because of low per capita income</b> in developing countries, it is <b>difficult to justify investments</b> in telecommunications.
66	4.83	1.53	pr6	Developing countries <b>simply copy the policies and regulations of developed countries</b> without consideration of differences in conditions.

Table I (Continued)

Descriptions of Ranked 127 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
67	4.83	1.60	pr22	While developed countries (e.g. European Community) are taking their time in studying and implementing changes, developing countries are <b>being pushed to privatize quickly.</b>
68	4.81	1.62	pr7	Developed countries <b>use their own policy and regulation</b> (i.e., deregulation) as a <b>standard</b> and apply them to developing countries which may be at different stages of development.
69	4.77	1.72	kw8	The international and regional telecommunications organizations <b>have not been effective in convincing ministers</b> in developing countries who are responsible for such sectors as finance, development, industry, public safety and health, that becoming a developed country requires developed communications.
70	4.77	1.86	te5	<b>Western industry</b> is often willing to sell equipment, technology and services, but <b>less willing to help developing countries build or manufacture</b> their own equipment.
71	4.75	1.39	fi7	<b>Poor credit control</b> affects the ability of PTTs to generate sufficient funds for network development.
72	4.75	1.55	fi15	<b>Funding</b> coming from bilateral and multilateral sources <b>is often slow</b> in responding to developing countries' needs.
73	4.75	1.61	fi23	Since international and/or regional <b>funding/aid agencies put higher priorities on other sectors</b> such as health, water, food and roads than on the telecommunications sector, requirements in the telecommunications sector cannot be met.
74	4.73	1.34	hm5	<b>Education and training aid</b> from international and/or regional telecommunications organizations <b>is insufficient.</b>

Table I (Continued)

Descriptions of Ranked 127 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
75	4.73	1.53	po2	PTTs have <b>no apparent willingness to develop services quickly</b> or in accordance with the wishes of their customers.
76	4.72	1.27	hm7	<b>Inadequate educational systems and facilities</b> as well as a <b>lack of interest in higher education</b> hinder efforts to develop human resources in developing countries.
77	4.72	1.39	kw6	Understandably, developed countries do <b>not easily share their expertise and advanced knowledge</b> with developing countries.
78	4.72	1.62	fi1	<b>The heavy investment required to provide the basic infrastructure to the whole country</b> , which is the priority in many developing countries, prevents telecommunications services from being a highly profitable business.
79	4.71	1.59	ss6	Due to <b>low income level</b> , the local community cannot effectively participate in the ownership and management of the telecommunications infrastructure.
80	4.70	1.65	pr15	<b>High call charges</b> are a contributing factor to slow telecommunications growth.
81	4.67	1.51	pr17	Developing countries are <b>very slow in opening their telecommunication markets</b> to national and international operators.
82	4.66	1.51	oa7	While everyone agrees that the ITU <b>must play a catalytic role</b> to stimulate telecommunications development and bridge the "gap," <b>it is not clear as to what this really means in practice</b> and how the ITU should share the responsibility with the wider ITU family.

Table I (Continued)

Descriptions of Ranked 127 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
83	4.65	1.51	te3	<b>The diversity of technological alternatives</b> in the market makes it difficult for some administrations in developing countries to choose the technology best suited to their requirements.
84	4.63	1.36	po16	Financing from <b>funding/aid agencies</b> is often difficult to get as a result of rather <b>stiff terms</b> which sometimes involve political considerations (e.g., democratization, restructuring of the sector in more liberal and commercial terms and sometimes outright demands for complete privatization).
85	4.63	1.38	oa9	International and/or regional telecommunications organizations have <b>not helped enough</b> developing countries to <b>establish modern organization and management</b> of the local operators.
86	4.61	1.49	pi1	Because of <b>lack of dialogue between users and service providers</b> in developing countries, service providers fail to offer appropriate services to users and users cannot convey their own needs.
87	4.61	1.61	pr8	<b>Policy and regulation</b> of telecommunications are <b>often imposed</b> by international and/or regional funding agencies.
88	4.60	1.40	pr26	The <b>aid policy</b> in developed countries <b>gives low priority</b> to telecommunications development.
89	4.59	1.57	hm2	<b>Training and training facilities</b> are <b>not adequately supplied</b> by developed countries.
90	4.58	1.46	hm12	International and/or regional telecommunications organizations <b>have not helped enough</b> developing countries to <b>set up regional training centers</b> , possibly with branches in different countries.
91	4.55	1.47	pr13	<b>Policies and regulations</b> in some developing countries <b>deter</b> the development of <b>value added services</b> .

Table I (Continued)

Descriptions of Ranked 127 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
92	4.54	1.45	pr9	International and/or regional telecommunication organizations <b>do not take into account</b> the fact telecommunications <b>infrastructure and needs for development vary substantially</b> from one country to another.
93	4.52	1.30	fi22	International and/or regional <b>funding agencies regard commercial loans more appropriate</b> than official loans for telecommunications development in developing countries.
94	4.52	1.49	hm13	<b>Tied assistance</b> for human resource development <b>fails to encourage</b> developing countries to be <b>independent and self sustaining</b> .
95	4.52	1.54	oa8	Administrations in international and/or regional telecommunications organizations are <b>more concerned about their self-preservation</b> .
96	4.51	1.46	fi21	<b>Funding</b> from international and/or regional funding agencies to the telecommunications sector is <b>only about 2%</b> of their total allocations.
97	4.49	1.63	fi16	International and/or regional <b>funding agencies are putting tough conditions</b> on loans to force privatization. That is, no change means no funds.
98	4.48	1.42	pr21	International and/or regional telecommunications organizations <b>do not involve</b> themselves enough in <b>national development policies</b> of developing countries. As a result, less effective, micro-development policies are created.
99	4.47	1.82	fi19	<b>Manufacturing investment</b> in developing countries with low market volumes is <b>not profitable enough for foreign investors</b> .

Table I (Continued)

Descriptions of Ranked 127 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
100	4.46	1.56	te4	<b>The technology being developed in developed countries is geared towards the commercial interests of the manufacturers and the needs of developed countries.</b> For instance, the technology offered by developed countries often is inappropriate for requirements such as low traffic, rural plain communications, easy implementation, and easy use and maintenance.
101	4.45	1.37	po15	Due to <b>political influence</b> , telecommunications network distribution may not necessarily serve public demands appropriately.
102	4.44	1.76	pr20	In some developing countries the <b>separation</b> of postal service and telecommunications service is <b>not implemented</b> .
103	4.43	1.50	hm8	Developing countries do <b>not emphasize education and training</b> . Inevitably the offers and funds from developed countries to help in this area are ignored, wasted, or not even used.
104	4.43	1.55	pr10	Policy and regulation from international and/or regional telecommunication organizations sometimes <b>do not consider local customs, cultures and idiosyncrasies</b> .
105	4.41	1.51	po13	<b>Politicians are more concerned about the possibility that uncontrolled access to telecommunications (information) could eventually jeopardize the stability of existing political power structures.</b>
106	4.40	1.54	pr16	<b>High rental costs</b> of telecommunications equipment are a contributing factor to the slow telecommunications growth.
107	4.40	1.71	te9	International and regional <b>funding/aid agencies' aid is tied</b> to certain telecommunications equipment.



Table I (Continued)

Descriptions of Ranked 127 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
108	4.38	1.53	pr25	<b>The obligation to serve high-cost customers is an obstacle in developing countries.</b>
109	4.37	1.56	fi20	<b>Developing countries focus on their own needs at the expense of foreign investors' needs.</b>
110	4.37	1.68	te6	<b>Developed countries push technology driven programs too much.</b>
111	4.33	1.47	ss2	<b>The concept of the economies of 'time' is not fully appreciated in developing countries. People do not care about 'time' and don't understand how telecommunications can save time.</b>
112	4.32	1.48	fi17	<b>Funding coming from bilateral and multilateral sources often attach conditions that have little to do with the economics of telecommunications.</b>
113	4.32	1.56	fi3	<b>The focus of the governments or monopoly telecommunications operators is to provide services to more profitable areas, where less investment is required, rather than in rural areas.</b>
114	4.29	1.74	te7	<b>Manufacturers in developed countries sometimes sell old technology.</b>
115	4.25	1.48	fi24	<b>The funding/aid agencies cannot see clearly the recovery of their investments in projects carried out in developing countries.</b>
116	4.25	1.58	fi5	<b>A local market base is too small for suppliers to thrive in developing countries.</b>
117	4.25	1.68	te1	<b>Technologies are changing too fast for developing countries to apply them economically to their systems.</b>
118	4.20	1.38	po17	<b>Funding/aid agencies are surreptitiously tying development and humanitarian aid to local or national politics.</b>

Table I (Continued)

Descriptions of Ranked 127 Obstacles

Rank	<u>M</u>	<u>SD</u>	Item	Description
119	4.16	1.60	po4	In some developing countries <b>the political will prefers one-way broadcasting</b> to two-way telecommunications.
120	4.13	1.60	hm10	Sponsorship for human resource development activities has been classified into two categories: 1) Least developed countries and 2) Non-least developed countries (non-LDC). <b>This division has caused some developing countries classified as non-LDC to lag behind</b> in human resource development due to lack of funds to sponsor their nationals.
121	4.08	1.42	hm11	International and/or regional telecommunications organizations usually do <b>not collaborate</b> in human resource promotion.
122	4.07	1.63	ss4	<b>Telephone services are provided only to certain types of people</b> such as government officials, the military, and the rich.
123	4.07	1.73	fi14	Developing countries have no other choice besides <b>depending on developed countries forever</b> . This is because developed countries control, through loans/grants, the kinds of technology, human resource development and knowledge that developing countries receive.
124	4.05	1.43	ss5	Telecommunications projects, being quite technical, have <b>not been able to obtain adequate community participation</b> .
125	3.83	1.48	ss3	In some developing countries, <b>people prefer communications in person</b> to communications through telecommunications media.
126	3.67	1.74	te2	<b>Developed countries do not provide</b> developing countries with <b>the most advanced technology</b> offered in the market.

Table I (Continued)

Descriptions of Ranked 127 Obstacles

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Rank	<u>M</u>	<u>SD</u>	Item	Description
127	3.52	1.67	ss1	<b>Illiterate citizens find it difficult to use telephones as they cannot independently operate the telephone.</b>

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## REFERENCES

- Babbie, E. (1989). The practice of social research (5th ed.). Belmont, California: Wadsworth.
- Bell, D. (1973). The coming of post-industrial society. New York: Basic Books.
- Bernt, P., & Weiss, M. (1993). International telecommunications. Carmel, Indiana: Sams.
- Berry, J. F. (1983). The case of France and Spain. Case study No.1 referred to in the Synthesis Report on the ITU-OECD Project "Telecommunications for Development."
- Breiner, L. (1992). Strategic review of telecommunications in the SADCC region. Telecommunications Policy, 16, 443-446.
- Brillson, P. V., & Daffner, G. (1995). Telecommunications development in a converging world: An examination of infrastructure and regulatory strategies in the Asia Pacific region. In R. Nickelson & D. J. Wedemeyer (Eds.), Proceedings of PTC'95 (pp. 551-556). Honolulu: Pacific Telecommunications Council.
- Casmir, F. L. (1991). Culture, communication, and development. In F. L. Casmir (Ed.), Communication in Development (pp. 5-26). Norwood, New Jersey: Albex.
- Choi, S. (1992). Unhappy dragon: Telecommunications and Korea's competitive advantage. Pacific Telecommunications Review, 14(1), 3-6.
- Chowdary, T. H. (1992). Telecommunications restructuring in developing countries. Telecommunications Policy, 16, 591-602.
- Clarke, D. G., & Laufenberg, W. (1983). The role of telecommunications in economic development: With special reference to rural sub-Saharan Africa. Case study No.4 referred to in the Synthesis Report on the ITU-OECD Project "Telecommunications for Development."
- Cronin, F. J., Parker, E. B., Colleran, E. K., & Gold, M. A. (1991). Telecommunications infrastructure and economic growth: An analysis of causality. Telecommunications Policy, 15, 529-535.
- Cronin, F. J., Colleran, E. K., Herber, P. L. & Lewitzky S. (1993). Telecommunications and growth: The contribution of telecommunications infrastructure investment to aggregate and sectoral productivity. Telecommunications Policy, 17, 677-690.
- Cutler, T. (1994). Contemporary telecommunications issues in the Pacific. Pacific Telecommunications Review, 16(2), 3-8.
- Dholakia, R. R., & Harlam, B. (1994). Telecommunications and economic development: Econometric analysis of the US experience. Telecommunications Policy, 18, 470-477.
- Dimech, F. Z. (1994). The role of telecommunications as a catalyst for qualitative change. IEEE Communications Magazine, 32(11), 32.

- Dizard, W. P. (1982). The coming information age. New York: Longman.
- Dordick, H. S., & Wang, G. (1993). The information society. Newbury Park, CA: Sage Publications.
- G-7 ministerial conference on the information society promotes deregulation. (1995, April 3). MPT (Ministry of Posts and Telecommunications in Japan) News. 6(1), 1-2.
- Gatica, L. (1994). Liberalization and tariff legislation in Chile. (1994). IEEE Communications Magazine. 32(11), 34-35.
- Gille, L. (1986). Growth and telecommunications. In Information, telecommunications and development. (pp. 25-61). Geneva: ITU.
- Hamelink, C. J. (1995). Information imbalance across the globe. In J. Downing, A. Mohammadi, & A. Sreberny-Mohammadi (Eds.), Questioning the media (pp. 293-310). Thousand Oaks, CA: SAGE.
- Hardy, A. P. (1980). The role of the telephone in economic development. Telecommunications Policy, 4, 278-286.
- Harrington, A. (1995). Companies and capital in Asia-Pacific telecommunications. In J. Ure (Ed.), Telecommunications in Asia (pp. 81-110). Hong Kong: Hong Kong University Press.
- Hayama, O. (1994). Information highway. ITU Journal, 24(4), Tokyo: New Nippon ITU Association, 32-36.
- Hirunrak, D. (1990). Communication technology and asia. The Journal of Development Communication, 2(2), 28-34.
- Hudson, H. E. (1983). The role of telecommunications in development: A synthesis of current research. In O. H. Gandy, P. Espinosa, & J. Ordover (Eds.), A Proceedings from The Tenth Annual Telecommunications Policy Research Conference (pp. 291-307). Norwood, NJ: Ablex.
- Hudson, H. E. (1984). When telephones reach the village: The role of telecommunications in rural development. Norwood, NJ: Ablex.
- Hudson, H. E. (1989). Overcoming the barriers of distance: Telecommunications and rural development. IEEE Technology and Social Magazine, 8(4), 7-10.
- Hukill, M. A., & Jussawalla, M. (1991). Trends in Policies for Telecommunication Infrastructure Development and Investment in the ASEAN Countries. Honolulu: East-West Center, Institute of Culture and Communication.
- Ikenberry, J. G. (1990). The international spread of privatization policies: Inducements, learning, and "policy bandwagoning." In E.N. Suleiman & J. Waterbury (Eds.), The Political Economy of Public Sector reform and Privatization (pp. 88-110). Boulder, CO: Westview Press.

Independent Commission for World Wide Telecommunications Development (The Maitland Commission). (1984). The missing link. Geneva: ITU.

International Telecommunication Union (ITU). (1994a). World telecommunication development report. Geneva: ITU.

International Telecommunication Union (ITU). (1994b). World telecommunication development conference final report. Geneva: ITU.

International Telecommunication Union (ITU). (1994c). African telecommunication indicators. Geneva: ITU.

International Telecommunication Union (ITU). (1995, January 26). Large private capital could soon flow to the developing world to launch profitable business ventures to close the communications gap. Press Release, 95-2, 1-4.

Jamieson, N. L. (1991). Communication and the new paradigm for development. In F. L. Casmir (Ed.), Communication in Development (pp. 27-50). Norwood, New Jersey: Ablex.

Jussawalla, M. (1986). The information economy and its importance for development of Pacific region countries. In Information, telecommunications and development, (pp. 63-86). Geneva: ITU.

Jussawalla, M. (1988). Information economies and the development of Pacific countries. In M. Jussawalla, D. M. Lamberton, & N. D. Karunaratne (Eds.), The cost of thinking: information economies of ten Pacific countries (pp. 15-43). Norwood, NJ: Ablex

Jussawalla, M. (1992). Is the communications link still missing?. Telecommunications Policy, 16, 485-503.

Jussawalla, M. (1994). Bringing telecoms to the market, and to market to telecoms. In Closing the telecommunications development gap: A study paper prepared in advance of the ITU World Telecommunications Development Conference. London: International Institute of Communications.

Jussawalla, M., & Ogden, O. R. (1989). The Pacific islands: Policy options for telecommunications investment. Telecommunications Policy, 13, 40-50.

Kamal, A. (1983). A cost-benefit analysis of rural telephone service in Egypt. Case study No.11 referred to in the Synthesis Report on the ITU-OECD Project "Telecommunications for Development."

Kaul, S. N. (1983). India's rural telephone network. Case study No.12 referred to in the Synthesis Report on the ITU-OECD Project "Telecommunications for Development."

Kelly, T. (1995). If the telecommunications industry is so successful, why can't the waiting list for telephone service be reduced?. Telecom 95, 7th World Telecommunication Forum, Strategies Summit Speakers' Papers: Vol. 1, Breaking down barriers towards the global information society (Session 13-10). Geneva: ITU.

- Kerlinger, Fred. N. (1986). Foundations of behavioral research (3rd ed.). Fort Worth: Harcourt Brace Jovanovich College Publishers.
- Kim, C., Kim, Y. K., & Yoon, C. (1992). Korean telecommunications development: Achievements and cautionary lessons. World Development, 20, 1829-1841.
- Kirunda-Kivenjinja, A. (1995). Telecom risks, telecom futures. Telecom 95, 7th World Telecommunication Forum, Strategies Summit Speakers' Papers: Vol. 1. Breaking down barriers towards the global information society (Session 16-2). Geneva: ITU.
- Kiula, N. (1994). Telecommunications development in Tanzania. IEEE Communications Magazine, 32(11), 36-37.
- Kuo, E. C. Y. (1993). Informatization among Asian NIEs: A Comparative study. In A. Goonasekera & D. Holaday (Eds.), Asian Communication Handbook (pp. 319-332). Singapore: Asian Mass Communication Research and Information Centre.
- Kyong, S. H. (1995). Resourcing for growth: Capital formation, human resources. Telecom 95, 7th World Telecommunication Forum, Strategies Summit Speakers' Papers: Vol. 1. Breaking down barriers towards the global information society (Session 15-3). Geneva: ITU.
- Lee, C. R. (1995). Capital formation. Telecom 95, 7th World Telecommunication Forum, Strategies Summit Speakers' Papers: Vol. 1. Breaking down barriers towards the global information society (Session 13-8). Geneva: ITU.
- Lesser, B., & Osberg, L. (1983). The socio-economic development benefits of telecommunications. Case study No.13 referred to in the Synthesis Report on the ITU-OECD Project "Telecommunications for Development."
- Lichauco, J. T. (1994a). Forging new links Philippine style. PTC'94 Plenary Presentations (pp. 14-19). Honolulu: Pacific Telecommunications Council.
- Lichauco, J. T. (1994b). Seeking sustained development in the "infrastructure of infrastructures." IEEE Communications Magazine, 32(11), 38-39.
- Lyon, D. (1995). The roots of the information society. In N. Heap, R. Thomas, G. Einon, R. Mason, & H. Mackay (Eds.), Information Technology and Society (pp. 54-73). Thousand Oaks, CA: SAGE.
- Maitland, D. (1994). Forging new links - Focus on developing economics. PTC'94 Plenary Presentations (pp. 1-5). Honolulu: Pacific Telecommunications Council.
- Masuda, Y. (1980). The Information Society. Washington, D.C.: World Future Society.
- Melody, W. H. (1993). The overlooked opportunity: Rural and remote are telecoms. Pacific Telecommunications Review, 15(2), 12-18.
- Moran, W. M. (1994). Telecommunications in transition. IEEE Communications Magazine, 32(11), 26.

- Naya, S (1988). Growing Asia-Pacific economic interdependence. In M. Jussawalla, D. M. Lamberton, & N. D. Karunaratne (Eds.), The cost of thinking: information economies of ten Pacific countries (pp. 7-13). Norwood, NJ: Ablex
- Ogden, M. R. (1995). Widening the chasm or closing the gap?: Converging information technologies & pacific island microstates. In R. Nickelson & D. J. Wedemeyer (Eds.), Proceedings of PTC'95 (pp. 592-599). Honolulu: Pacific Telecommunications Council.
- Olanrewaju, A. T. (1995). Investment needs: Resourcing for growth -capital formation, human resources. Telecom 95, 7th World Telecommunication Forum, Strategies Summit Speakers' Papers: Vol. 1, Breaking down barriers towards the global information society (Session 14-2). Geneva: ITU.
- Organization for Economic Cooperation and Development (OECD). (1988). The telecommunications industry: The challenges of structural change. Paris: OECD
- Parapak, J. L. (1994). The missing link and vision 2000. IEEE Communications Magazine, 32(11), 40-41.
- Parker, E. B. (1992). Developing third world telecommunications markets. The Information Society, 8, 147-167.
- Peirce, W. B., & Je'quier, N. (1983). Telecommunications for development. Geneva: ITU.
- Pisciotta, A. A. (1994). Telecommunications reforms: Options, models, and global challenges. IEEE Communications Magazine, 32(11), 28-31.
- Porat, M.U. (1978). Global implications of the information society. Journal of Communication, 28(1), 70-80.
- Ras-Work, T. (1995). Are there alternatives to privatization?. Telecom 95, 7th World Telecommunication Forum, Strategies Summit Speakers' Papers: Vol. 1, Breaking down barriers towards the global information society (Session 12-6). Geneva: ITU.
- Saunders, R. J. (1982). Telecommunications in developing countries: Constraints on development. In M. Jussawall & D. M. Lamberton (Eds.), Communication economics and development (pp. 190-210). Honolulu: The East-West Center.
- Saunders, R. J., Warford, J. J., & Wellenius, B. (1994). Telecommunications and economic development (2rd ed.). Baltimore, MD: John Hopkins University Press.
- Sekizawa, T. (1995). Critical formation for building telecom infrastructure in developing countries: Utilization of private funds and mission of suppliers. Telecom 95, 7th World Telecommunication Forum, Strategies Summit Speakers' Papers: Vol. 1, Breaking down barriers towards the global information society (Session 13-6). Geneva: ITU.
- Servaes, J. (1991). Toward a new perspective for communication and development. In F. L. Casmir (Ed.), Communication in Development (pp. 51-85). Norwood, New Jersey: Ablex.



Tabai, I. T. (1994). Telecommunications in the Pacific. PTC'94 Plenary Presentations (pp. 41-43). Honolulu: Pacific Telecommunications Council.

Tarjanne, P. (1994). The missing link: Still missing?. PTC'94 Plenary Presentations (pp. 6-13). Honolulu: Pacific Telecommunications Council.

Technological innovation and employment. (1986). Tokyo: Economic Planning Agency.

Toffler, A. (1990). Power Shift. New York: Bantam books.

Uphoff, N. (1985). Fitting projects to people. In M. Cernea (Ed.), Putting People First: Sociological Variables in Rural Development (pp. 359-395). New York: Oxford University Press.

Ure, J. (1993). Corporatization and privatization of telecommunications in ASEAN countries. Pacific Telecommunications Review, 15(1), 3-13.

Ure, J. (1995a). Telecommunications in China and the four dragons. In J. Ure (Ed.), Telecommunications in Asia (pp. 11-48). Hong Kong: Hong Kong University Press.

Ure, J. (1995b). Telecommunications in ASEAN and Indochina. In J. Ure (Ed.), Telecommunications in Asia (pp. 49-80). Hong Kong: Hong Kong University Press.

Vice President Gore's GII. (1994, June). ITU Journal in Japan, 24(6), 14-19.

Wellenius, B. (1989). The impact of modern telecommunications. IEEE Technology and Social Magazine, 8(4), 3-6.

World Telecom Visual Data. (1995). Tokyo: New Nippon ITU Association.