Saudi Arabia: A Unique
Telecommunications
Experience

by Alawi D. Kayal

126,500 lines by 1974. The following year another milestone was reached with the completion of a combined microwave/coaxial cable between the main cities of Jeddah on the Red Sea and Damman on the Arabian Gulf. It also linked Riyadh, the capital, with the centers of Makkah, Taif, and Damman.

By the early 1970s, the kingdom had instituted a series of five-year development plans, focused on the major sectors of the national economy. Its assets were its enormous oil reserves and the export revenue they earned. The government adopted an ongoing policy of encouraging industrial development by building national infrastructures and providing them, along with land and energy, with a favorable tax environment. A quality telephone network was a high priority.

9.3   The Modern Era and the Second Five-year Plan

A major event in the development of the telecommunications network in Saudi Arabia was the Second Five-Year Plan (1975-1979), which budgeted approximately 500 billion Saudi riyals (US$140 billion) -- predominantly from rapidly increasing oil revenue -- to meet its objectives. It achieved a primary goal, construction of a modern telecommunications network, and sparked a rapid expansion in the number of telephone services. 1975 saw a significant milestone

reached when the east and west coasts of the kingdom were linked by coaxial cable and microwave routes.

A number of telex projects were begun a year earlier in 1974. The existing telex network only provided a capacity of 300 lines for local calls between governmental departments and other officials in Riyadh, but new exchanges established in Riyadh, Jeddah, and Damman grew from a total capacity of 3,000 lines in 1974 to 16,000 lines in 1978. Demand grew even faster, though, so three additional telex exchanges were added, again in Riyadh, Jeddah, and Damman, with 20,000 lines each. Subsequently, telex service followed the expansion of the public telephone network into the kingdom's towns and villages.

Until 1983, teleprinters used either the Latin alphabet (for local, national, and international telex calls) or Arabic (for local and national calls). Then, when Arabic became an international telex language, the kingdom combined them into one bilingual teleprinter with the assistance of Siemens, the German company, who manufactured the teleprinters to the Ministry of PTT specifications. Three thousand bilingual teleprinters were quickly introduced into the network, in addition to the 17,000 Latin teleprinters already in operation.

In the 20 years since the second Five Year Plan was launched, the Saudi telecommunications network has grown more than ten-fold, providing an

effective and comprehensive system by world standards supported by a strong commitment to efficient operation and maintenance.

9.4   Telecommunications in the 1990's

In 1995, the network included in excess of 1.7 million installed exchange lines and more than 200 exchanges, a fully automatic electronic telecommunications system serving over 1.5 million customers in over 300 cities and towns, as well as many villages. In addition, customers were offered a range of supplementary services, such as mobile telephone service, radio paging, and a packet switched data network. More than half of the kingdom's telecommunication lines were located in Riyadh, Jeddah, and Damman, where over one third of the population lives -- approximately 13 to 16 services per 100 inhabitants against about 10 services per 100 for the country as a whole. Lack of funds has kept the system from reaching many small and remote communities, but in the next few years the government expects to integrate almost all outlying areas.

Basic telephone service in multi-exchange areas is 98% digital in both switching and transmission, while the long-distance transmission network is 98% analogue and utilizes microwave and coaxial cable media. Optical Fiber cable was introduced into the junction (local) network in 1981 while the first trunk

(long distance) application was in 1986 between Makkah and Jiddah. It will make possible a mix of optical fiber and microwave transmission, and plans are underway to make all network expansion digital.

The provision and administration of telecommunications in the Kingdom of Saudi Arabia has always been the responsibility of the government, and official policy advocates continued public operation of the network as the best way to achieve security, equity, and economic benefits. This policy was first established by the Council of Ministers Decree No. 517 of 1973. Two years later, the Ministry of Posts, Telegraph & Telephone (MoPTT) was founded under Dr. Alawi Darweesh Kayal, who continues to head it. MoPTT acts on the authority vested in it by the kingdom's Council of Ministers. The Ministry's operating arm for telecommunications, with the public title of Saudi Telecom, is directed by the Deputy Ministry of Operation's and Maintenance Affairs and is responsible for the day to day running of the network, as well as for business activities and customer interface.

In practice, however, though there are a number of exceptions to the monopoly policy. For example, a number of private networks exist which, while steadily being absorbed into the national network, temporarily supplement it and are accepted as a viable alternative to MoPTT. In addition, in keeping with the

government's privatization policy, the customer premises equipment market has been returned to the private sector, while the MoPTT focuses on the provision, operation, and maintenance of national network services.

Nevertheless, the overall administration of telecommunications in the kingdom is closely tied to government policy and to civil service regulations through decrees issued by the Council of Ministers, which is chaired by the king and advises him on policy matters. A good example is the funding structure of MoPTT and consequently of Saudi Telecom: all expenditures are funded directly from government budget allocations through the Ministry of Finance & National Economy (MoPNE). This means that the telecommunications sector must compete with the other sectors of the national economy for a share of the kingdom's total budget. Further demonstration of this financial dependence on the government is the fact that MoPTT/Saudi Telecom does not retain any of the revenue it collects but turns it over to the kingdom's central bank, the Saudi Arabian Monetary Agency (SAMA). However, in the interests of greater operational efficiency, the telecommunications sector is expected to apply commercial management practices and to be as responsive to the needs of its customers as possible. As the Fifth Five-Year Plan (1990-1995) states, "budget autonomy should be the final target."

9.5   Tariff Structure

Decree No. 517 states that "The Council of Ministers shall regulate procedures for

securing [telephone] services and [shall] fix tariffs." Historically, the

government's approach in setting tariffs has been to make basic telephone service

affordable to all residents of the kingdom, resulting in a relatively inexpensive

overall tariff structure that strongly favors local and national telephone services.

As a result, in 1994, the revenue earned by MoPTT from the international sector

of the business currently constitutes approximately 50% of its total income and

international telephone service heavily subsidized local and national telephone

services. (See Table 9.1)

Insert Table 9. 1

9.6   The Expanding Product Range

The modern Kingdom of Saudi Arabia has placed great emphasis on diversifying

its economy and generally broadening its economic base beyond dependence on

oil. The government has actively encouraged investment in a wide range of

industrial and commercial activities within the kingdom, resulting in a strong

economy and a business community that demands the latest in value-added

telecommunications services in order to constantly improve efficiency and maintain regional and international competitiveness. In addition to basic telephone service, therefore, a growing range of other telecommunications products and services are being made available. These include Al Waseet (packet switching), Attareeq (private data lines), voice-grade leased lines, AMTS (large cell), 800 service, voice vertical service, radio paging, and Smart Pay phone (card-phone). Other products and services planned for introduction in the near future include GSM (1996), electronic mail (1998), ISDN (1999).

9.7   Fifth Five-Year Development Plan

The Fifth Five-Year Development Plan, covering the period 1990-1995, illustrates the Saudi Government's view of the role of telecommunications in the kingdom and the industry's future direction. The key issues addressed in the plan are: coverage of telecommunications services, new technologies in telecommunications, and operational efficiency.

The plan declares that "the single most important unresolved issue. . . is the incomplete service coverage." This statement emphasizes the government's clear commitment to universal telephone service and its recognition that the development of rural areas, private sector businesses, and the economy as a whole

necessitate expanding availability to meet the country's requirements. The Fifth

Five-Year Plan indicated that the demand for basic telephone service in

1409/1410 (H) was an estimated 1.9 million compared to 1,2 million services in

operation, i.e. a shortfall of about 700,000. Strategic Planning documents

produced in Saudi Telecom in 1414/1415 (H) indicated a demand of

approximately 2.8 million (compared to the Five-Year Plan figure of 2.5 million)

against about 1.7 million services in operation, i.e. a shortfall of about 1.1

million. The 5 year plan forecasts indicated a widening in the gap from 700,000

to 800,000 over the period of the plan. At first glance this would indicate that the

gap between demand and services in operation had widened by a considerable

margin. Some of this could, however, be attributed to the methods of recording

and counting demand for service in 1415 compared to, say, 1408 when the inputs

to the Fifth Five-Year plan was produced. The gap had actually widened from

7000, 000 to 800,000 over the period of the plan. However, some of this may be

attributed to changes in the methods of recording and counting demand for

service between the two periods.

The telecommunications industry reflects above all the impact of the

technology revolution. The Fifth Plan also commits the kingdom to a policy of

maintaining its high-quality network in a rapidly changing market, and recognizes

that to meet this challenge it will be necessary to invest in ongoing network

modernization:

> The rapid introduction of new technologies in the
> telecommunication's network is now necessary in order to:
> -   increase utilization of the network and meet
>   existing demand
> -   provide a digital long-distance transmission
>   network and a digital telephone network
> -   maintain high quality standards and ensure that, as
>   part of the global telecommunication's network, the
>   Kingdom's network keeps pace with rapid
>   development in other countries.

9.8   Network Architecture

In 1995, the basic network architecture was a typically hierarchial one which was

developed for crossbar and stored processor controlled exchanges in the 1970s

and 980s. It consisted of essentially 5 hierarchial exchanges more than one layer

apart and of final (last) choice routes which follow the strict hierarchial

dependencies. Bottlenecks can occur in such a network when unusually large

traffic is generated from a particular source in a short time frame, e.g., at the

sighting of the new moon at the start of the holy month of Ramadan.

By contrast, the new network architecture being implemented as a part of

the TEP6/GSM Project (discussed below) is much flatter and eliminates several

layers. The trend toward flatter networks is a global phenomenon and is

facilitated by the large amount of bandwidth which becomes readily available from the use of optical fiber, the greater computing capacity of modern switching exchanges and the utilization of remote subscriber units at long distances from the host or service node. Common Channel Signaling System No. 7 and Synchronous Digital Hierarchy, which are essential elements of a modern digital network are also being utilized.

9.9   Privatization

The issue of privatization in telecommunications needs to be considered in the wider context of the relationship between the Saudi government and the private sector. The government has for many years encouraged private sector participation in the provision of various services, and not simply through private ownership of an enterprise. Business has, for example, been urged to supply goods and services to government agencies, and to take over some of their functions. It is clear from the Fifth Plan that this broad policy will be maintained, and it will no doubt significantly affect the telecommunications sector in the future. However, the plan does advocate continued government control of networks:

> In the field of services and terminals some
> privatization and even competition between private

companies is desirable. For networks, however,
important government responsibilities for national
security and the equitable distribution of services, in
addition to the economies of large-scale production,
all support continued operation by public
organizations.

Privatization also raises the question of structural change. Some studies conducted by international consultants for MoPTT during the 1980s strongly urged establishment of a "crown corporation," a semi-autonomous, government-owned business enterprise, to run the telecommunications administration. This proposal continues to be debated, but no steps have been taken to alter the current ministerial structure, due to general agreement that the commercial, social, and political environment would not support in the mid-1990's. Instead, the widest consensus, especially within the ministry itself, favors encouraging the ministry and its operating arm, Saudi Telecom, to function more commercially by eliminating inefficient, civil service-type regulations, so that telecommunications can be operated as a business within the framework of government protection and support. A major reason is that the sector has achieved a profitability rate in excess of 40%.

Among a small number of domestic producers of telecommunications equipment is the Saudi Cable Company, which supplies cables to both the local

and export markets. There are also smaller companies involved in the

manufacture and testing of pay phones. While few foreign suppliers have

participated in the telecommunication sector, the major switch provider to date

has been L.M. Ericsson, and most others are represented in the network.

Contracts are awarded through competitive bidding.

A new initiative, however, marks a major advance in international

cooperation. In August, 1994, MoPTT signed the biggest contract ever with The

American Telephone and Telegraph Company (AT&T) to implement the TEP6

project, which targets 1.5 million new fixed lines and 200,000 new mobile lines

"GSM" (expanded to 500,000 lines), together with the complementary elements

needed to double the size of the network and to modernize it using the latest

digital technology.

9.10   International Cooperation

International cooperation in the area of telecommunications has been a keynote of

Saudi Arabian policy since the kingdom emerged as an important player in the

field. It participates in the various programs of the International

Telecommunications Union (ITU) and is a major contributor to INTELSAT, with

a seat on the board of governors. It is also heavily involved in ARABSAT, as

one of its largest shareholders and users and as home to its Riyadh-based headquarters.

The Kingdom also paid more than a third of the 1985 launch cost for the three ARABSAT satellites, which now provide over 8,000 telephone circuits for all Arab countries, namely: Kingdom of Saudi Arabia, United Arab Emirates, Qatar, Bahrain, Oman, Kuwait, Yemen, Iraq, Syria, Palestine, Jordan, Lebanon, Egypt, Sudan, Solomania, Libya, Tunisia, Algeria, Morocco and Mauritania. This project exemplifies the kingdom's active collaboration with neighboring states in developing international telecommunication's facilities, a policy encouraged by its membership in regional alliances such as the Arab League and the Gulf Cooperative Council. It has also worked closely with other countries on the maritime satellite, INMARSAT, which makes possible full two-way communication with ships anywhere on the oceans of the world. Ship-to-shore telecommunications for both the Red Sea and the Arabian Gulf are provided by a commercial, 24-hour coastal radio system. In addition, Saudi Arabia is one of the major users of and investor's in the SEA-ME-WE cable, an intercontinental submarine cable that since 1986 has linked both Southeast Asia and Western Europe with the Middle East -- the cable landing point is at Jeddah -- and the kingdom is also an investor in the SEA-ME-WE 2 (fiber optic cable) in operation

since July 1994. As a result of the high priority given to its telecommunications interface with the rest of the world, it is now possible to dial direct to 185 countries from within the kingdom. Through its four international gateway exchanges, more than 99.8% of its international calls are direct dialed.

9.11   New Challenges and the Process of Change

It has been, and continues to be, a major challenge for the kingdom to provide modern technology-based infrastructures such as the telephone network in a manner and at a rate that does not threaten the social and cultural fabric of Saudi society. The government regularly addresses these concerns in its planning and policy-making.

In recent years, however, the Kingdom's telecommunications system had entered a period of consolidation. The great leap forward between the mid-1970's and the mid-1980's ended with a marked decline in the level of capital invested in network expansion and modernization. And, where there was still a long-term plan to provide universal basic telephone service to the population of the kingdom, the push to do so had stalled well short of the target.

All of this changed abruptly; with the signing of the contract that initiated the TEP6 Project in August 1994. The contract between MoPTT and AT&T

launched the biggest telecommunications project in the history of the Kingdom of Saudi Arabia and the biggest ever awarded to AT&T outside the United States. Scheduled for completion by 2001, it aims to expand the nation's telephone network by 1.5 million lines, doubling the size of the existing switching network while adding 200,000 GSM mobile telephone lines, expandable in the near future to 500,000 lines. Concurrently, a comprehensive upgrading of the network is planned by introducing the most sophisticated digital technology available. Total value of the project is US$4.5 billion, operational revenues will cover all costs during implementation and later are expected to produce a surplus of US$1.5 billion annually.

Basic components of the project include:

- Telephone exchanges with a capacity of two million lines, both fixed and mobile

- More than 500 base stations for the GSM network

- An outside plant network comprising about 5,000 conventional and electronic cabinets

- A fibre optics junction network linking all exchanges in the main cities, and linking radio base stations with GSM exchanges.

- A high capacity fibre optics transmission network, of Sonet digital

hierarchy technology, with a speed of 622 Megabytes/second

(STM4), and 2.5 Gigabytes/second (STM16). This network, more

than ten thousand kilometers in length, will connect the kingdom

in all directions, east to west and north to south

- A digital microwave network linking remote and mountainous area

    with other regions

- One hundred Subscriber Radio Systems "SRS" to provide

    telephones and other telecommunications services to rural areas.

    SRS is a concentrator system which uses radio from the radio

    concentrator to the "host" switching center and usually (but not

    necessarily) radio from the concentrator to the subscribers.

- A satellite network based on digital technology connected with the

    Intelsat, Arabsat, and Inmarsat networks

- Telecommunication Management Networks (TMN) are

    sophisticated information systems of operations and management

    for monitoring and control. TMN is a transport network which is

    used by network managers to facilitate the collection and

    management of network management data.

The final result will be one of the most advanced telecommunications systems in the world, both technologically and in terms of service standards. The Saudi Telecommunications system has experienced rapid growth in the past twenty years. In less than two decades, the number of main lines has grown by over 1000%! The rapid expansion of the network has been complemented by the introduction of numerous new products-- such as a packet switched network and radio paging. Despite a slowdown in network investment and expansion during the early 1990's, the kingdom is on the cusp of another great surge in telecommunications development. Future services will include a GSM network e-mail and ISON services.

In the future, Saudi Arabia will likely follow international trends, and separate the regulatory functions of the MoPTT from its operational functions. When and if privatization does occur, the Saudi Telecom will have great value since it will have one of the most advanced telecommunications system in the world.

Editor's Note:

During 1996, the Minister of Posts, Telegraphs and Telephones, Dr. Ali ibn Talal Al-Johani, announced an important change in government policy. He

announced the creation of a committee to study not only privatization of mobile

services, but all telecommunications as well. Although no action has been taken

as of this writing, the announcement represents a fundamental change in position

from the Fifth Five-Year Plan. The Sixth Development Plan (1995-2000) follows

this trend by discussing not only the provision of POTS, but of advanced services

like paging, mobile phones, leased lines, and data communications. The GSM

network is already up and running with high demand, even though costs are high.

Chapter IX

Saudi Arabia

Table 9.1

Tariff Rates for the Kingdom of Saudi Arabia

(As of 1 January 1995)

	SAUDI RIYAL (SR)	U.S.DOLLARS ($US)
Subscription	360	95
Connection/Installation	500	125
Local Calls	0.125	0.033
Long Distance (100km)	0.20/min [1]	0.05/min

International[2]

Europe

(France)	8.00/min	2.15/min
(Netherlands)	11.00/min	3.00/min

Asia

(Japan)	11.00/min	3.00/min
(Philippines)	13.00/min	3.47/min
U.S.A.	8.00/min	2.15/min

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[1]For national calls there is a 20% discount between 10:00 PM and 8:00 AM each day.

[2]The settlement rates negotiated between the kingdom and other countries are a significant factor in determining international tariffs.