

5

Tanzania

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5.1 Physiography

The United Republic of Tanzania is a littoral state of the Indian Ocean located between longitudes 29 and 40 degrees east and latitudes 1 and 11 degrees south. The United Republic of Tanzania is made up of a union of two formerly independent countries—Tanganyika (on the mainland) and the islands of Zanzibar and Pemba in the Indian Ocean. Tanzania mainland (formerly Tanganyika) has an area of 94,000 square kilometers of which 20,000 square kilometers is covered by lakes. The islands of Zanzibar and Pemba have a combined area of 2,500 square kilometers.

The population of Tanzania in 1995 was estimated to be 30 million growing at an average annual rate of 2.8 percent. The overwhelming majority of the rural population consists of small holder farmers and herders.

5.2 Economics and Politics in Tanzania

The primary economic activity in Tanzania is agriculture, which in recent years has accounted for about 40 percent of the GDP and about 70 percent of annual export earnings. Tanzania also has a small industrial sector and a small manufacturing sector, both accounting for less than 20 percent of the GDP.

Between 1967 and 1991 Tanzania followed a socialist economic philosophy. A large parastatal sector was built up to carry out activities in the areas of industry, agriculture, transport and communications, mining, education, health, fisheries, and so on. But starting in 1991, Tanzania has been following a free-market, capitalist philosophy. The government has started divesting itself of all production parastatals and is encouraging private-sector participation in the economy.

For about the past thirty years, Tanzania has been ruled by one political party. In 1992, however, Tanzania adopted a multiparty political system. The first multiparty parliamentary and presidential elections were held in October 1995.

Economic and political liberalization has gone hand in hand with the liberalization of policies governing the news media. Tanzania has gone from a state where

all news media were government controlled to a state where there is vibrant private press, private radio stations, and private television companies.

5.3 Recent History of Tanzania

In April 1964, Tanganyika united with the Indian Ocean islands of Zanzibar and Pemba to form the United Republic of Tanzania.

Tanganyika was a German colony up to 1918, the end of the First World War. From 1918 to 1961 Tanganyika was ruled by Great Britain as a Trustee Territory of the League of Nations (1918–45) and of the United Nations (1945–61). Tanganyika obtained her independence from Great Britain in 1961 and became a republic in 1962.

5.4 Telecommunications in Tanzania Today

Telecommunications services in Tanzania were provided by one public-switched telephone network (PSTN) operator, the Tanzania Telecommunications Company Limited (TTCL). Private telecommunications networks are also operated by the railways, the harbors, the electric utility, the military and security establishment, and private and public mobile and nonmobile radio communications systems.

5.4.1 *Private Telecommunications Networks*

Although the military and other security services operate private radio and telecommunications networks, no data on these networks are available in the public domain, and therefore, these networks will not be covered in this chapter. Of the remaining private networks, the large ones belong to the Tanzania Electric Supply Company (TANESCO), SITA (the airline reservation system), and the railway signaling and telecommunications systems of the Tanzania Railways Corporation (TRC) and the Tanzania Zambia Railway Authority (TAZARA).

The TAZARA telecommunications system links all stations along the railway line. The system has automatic exchanges in all electrified towns and magneto exchanges in nonelectrified towns. Some magneto exchanges have been replaced with automatic ones by using photovoltaic power systems in nonelectrified stations.

The TRC telecommunications system also links all stations along the railway network. The TRC network has automatic exchanges in electrified towns and in stations with photovoltaic power systems. It uses magneto exchanges in other stations. Maintenance of the TRC network is done under contract by TTCL.

The SITA airline reservation system links major airline offices in Dar es Salaam with other offices worldwide via leased voice grade circuits through Nairobi to London. Although the SITA network is a packet-switched network, it is operated in a circuit-switched mode from Tanzania to London. Within Tanzania, the Air Tanzania Corporation (ATC) operates terminals in major up-country towns it serves and in Zanzibar. These terminals access the SITA network through a gateway in Dar es Salaam. The ATC network uses a star topology with messages

between any two terminals in the network having to pass through the node in Dar es Salaam. The SITA network enables any ATC terminal to access, store, and/or retrieve data from host computers belonging to SITA that are situated in the state of Georgia in the United States.

The TANESCO telecommunications system provides voice communications services needed to control the operation of its interconnected electricity generation, transmission, and distribution system. In order to improve its reliability in operating this interconnected network, TANESCO has installed a system for supervision, control, and data acquisition (SCADA) that is built up as follows:

- A control center in Dar es Salaam.
- A SCADA system connected to existing power plants and substations with possibilities of up to fifty connections.

The SCADA system transmits data over voice grade circuits using several voice frequency telegraph (VFT) channels that employ frequency modulation (FM) in accordance with international telecom recommendations: R.35 (50 baud), R.37 (100 baud), and R.38A (200 baud). Separate VFT channels are also provided for telephony and telex systems.

The TANESCO telephone system deployed fifteen automatic exchanges with a capacity of 288 connections, out of which 75 connections were used as trunk lines. This telephone system has more sophisticated traffic handling facilities than those available on the TTCL network. For example, TANESCO's system offers a conference facility, multiaddress signaling, and prioritized customer categories. The telex system operated by TANESCO links ten substations and offers full duplex communication between the substations.

5.4.2 The Telecommunications Network of TTCL

5.4.2.1 Basic Services

Voice telephony and telex services are offered by the Tanzania Telecommunications Company Limited, the only PSTN operator so far licensed. The PSTN consists of switching, transmission, and subscriber loop facilities. In switching there is a diversity of equipment ranging from old step-by-step exchanges through crossbar exchanges to digital switches.

Tanzania had a total of 218 exchanges in 1995, out of which 34 were digital with 39,000 direct exchange lines (DELs). Table 5.1 presents data on these exchanges, including their number, their suppliers, and their capacity. All manual exchanges are from Ericsson of Sweden. The total installed capacity in 1995 was 130,000 lines. The average exchange fill was about 74 percent, and 99,000 DELs were connected. Of the DELs connected in 1995, 38 percent were served by thirty-two analog exchanges and 52 percent were served by thirty-four digital automatic exchanges. The remainder of the lines were served by 152 small manual exchanges. Seventy percent of the exchanges, serving over 40 percent of the subscribers, are more than twenty years old and in poor condition.

In 1995, the telephone density in Tanzania at 0.33 DELs per 100 population was among the lowest in the world. Service is concentrated on Dar es Salaam,

Table 5.1. Exchanges and Suppliers

Switch Type	Supplier/ Manufacturer	Country	Quantity	Capacity (no. of lines)
Digital Exchanges				
GX 5000	Mitel	Canada	17	17,700
NEAX61E	NEC	Japan	6	26,000
FETEX F150	Fujitsu	Japan	4	10,000
HDX 10	Hitachi	Japan	2	6,000
S 12	Alcatel	Belgium	2	3,000
FEDEX 100	Fujitsu	Japan	1	2,000
CDOT 128	W. S. Telesystems	India	1	80
ELTEX V	Sagem	France	1	20,000
Total			34	66,780
Analog Exchanges				
C 400	Hitachi	Japan	10	22,200
C 23	Hitachi	Japan	13	8,200
S × S	Plessey	U.K.	4	13,100
C5	Hitachi	Japan	3	2,502
X-Bar BTM	Bell	Belgium	2	550
	Total		32	46,442

connecting it with all major towns in Tanzania and with the neighboring countries of Malawi, Zambia, Kenya, Rwanda, and Uganda. International voice traffic is transmitted via earth satellite stations at Dar es Salaam. By 1998, the telephone density increased to 0.62 DELs per 100 population.

There is an automatic international digital telex exchange in Dar es Salaam. Telex service is also available to fifteen other major towns in Tanzania served by three analog and one digital exchange. Total telex capacity is about 4,000 subscribers.

Although the only problem with telex service is inadequacy, telephone service is not only inadequate but also congested and unreliable. The inadequacy of the telephone service is so severe that the number of customers waiting to be provided with service countrywide is about 150,000, whereas the number of DELs is 99,000. The real pent-up demand is estimated to be 400,000. Congestion on the network is caused mainly by poor maintenance and inadequate capacity (both switching and transmission capacity) on the trunk network. The poor maintenance results in high fault rates, with an average of about 70 percent of DELs being in working condition at any one time.

The traffic on the network of the Tanzania Telecommunications Company Limited (TTCL) is 60 percent local and 30 percent trunk, with the balance being international traffic.

A Memorandum of Understanding signed by TTCL and the government of Tanzania set up specific performance targets on network performance, revenue generation, and staffing that TTCL has to meet. An independent consultant is engaged annually by the regulatory authority to carry out a performance audit of TTCL to verify whether or not TTCL is meeting the agreement and license targets.

Some of TTCL's customers have started using callback (or call reorigination)

equipment to take advantage of the low telecommunications tariffs available in the United States. The use of the callback facility has had a negative impact on the revenue that TTCL obtains from international traffic.

Tanzania is one of the twenty-five poorest countries in the world. As such it receives most of its aid from developed countries in the form of grants rather than loans. The telecommunications sector has not been an exception. Prior to the inauguration of the Telecommunications Restructuring Program (TRP), some developed countries provided grants that enabled TTCL and its predecessor TPTC to rehabilitate and expand the telecommunications network in Tanzania.

Some of the donor countries that have provided grants for investments in the telecommunications network in Tanzania have not been keen to see TTCL privatized. These countries called for a feasibility study on the privatization of TTCL, specifically taking into account investments they had made in TTCL through grants to the government of Tanzania.

5.4.2.2 Mobile Cellular Telephony

Tanzania licensed a private company to offer mobile cellular telephone service starting in 1993. The company used analog technology to provide the service to customers in Dar es Salaam and Zanzibar.

In 1994, another private company was licensed to offer mobile telephone services in Dar es Salaam and Zanzibar, using digital GSM technology. Subsequently, TTCL began to offer mobile cellular telephone service to some of the other large towns in Tanzania.

5.4.2.3 Data and Paging Services

Data services were provided in Tanzania after 1996 through a joint venture between TTCL and a French company. TTCL also offered paging services.

5.4.2.4 E-Mail and Internet Services

Electronic mail services are at their infancy in Tanzania with less than ten nodes connected to the FIDONET network in 1995. The largest number of E-mail users was at the University of Dar es Salaam. The computing center at the university, which operates the E-mail system, also operates terminals where the public can send and receive E-mail messages.

Starting in January 1996, full Internet services became available for the first time in Tanzania via a leased circuit to Uninet (South Africa). The circuit had 9.6 Kbps of capacity. The University of Dar es Salaam was the first institution to offer Internet services in Tanzania.

5.4.2.5 Taxes

The government requires TTCL to pay the following taxes:

1. Sales tax on telephone and telex services at the rate of 15 percent of the revenue earned from the provision of the service.
2. A corporation tax at the rate of 35 percent of the profits.
3. A payroll levy at the rate of 4 percent of the gross emoluments paid to staff.
4. A stamp duty at the rate of 1 percent of the receipts of the company.

5.4.2.6 Non-Core Business Activities

The operating license of TTCL permits the company to engage in businesses other than telecommunications. The policy of the company is, however, that of divesting itself of all non-core businesses.

5.4.3 The Regulatory Environment

5.4.3.1 The Tanzania Communications Commission

The government of Tanzania established the Tanzania Communications Commission in 1994 to regulate, among other things, the provision of telecommunications services in Tanzania. In that regard, major functions of the commission are as follows:

1. To license providers of telecommunications services.
2. To license and regulate the allocation and use of satellite orbits and the radio frequency spectrum.
3. To approve telecommunications tariffs.
4. To promote competition in the provision of telecommunications services.
5. To approve equipment to be used in the provision of telecommunications services.

Prior to the formation of the Tanzania Communications Commission, regulatory functions and the provision of postal and telecommunications services were being carried out by the same organization, the Tanzania Post and Telecommunications Corporation (TTPC)—an organization that was created in 1977 to replace the East African Posts and Telecommunications Corporation following the breakup of the East African community in 1977.

The Tanzania Communications Commission is mandated to promote the development of rural telecommunications in Tanzania. To achieve this objective, the commission plans to set up a Rural Telecommunications Development Fund to which all licensed operators of telecommunications networks in Tanzania must contribute.

5.4.3.2 The License Granted to TTCL

The Tanzania Communications Commission (TCC) granted a license to TTCL in 1994 allowing the company to provide telecommunications services in Tanzania. The main highlights of the license are as follows:

1. It does not give TTCL a monopoly status. The commission is at liberty to license other providers of telecommunications services.
2. The duration of the license is twenty-five years, and it cannot be revoked in the first fifteen years.
3. Cross-subsidies in TTCL's tariffs are not allowed.
4. Once every year TTCL must undergo an efficiency audit to verify operational performance vis-à-vis targets set in the license.
5. Interconnection service must be provided by TTCL, at rates approved by

the commission, to all other parties wishing to offer telecommunications services in Tanzania.

The terminal equipment market is fully liberalized, and TTCL has allowed private individuals and companies to perform internal wiring of customer premises.

The license granted to TTCL commits it to the provision of universal service. Since most people in Tanzania live in rural areas where there is little business to pay for telecommunications facilities, provision of universal service is to be made possible by requiring all telecommunications licensees to contribute to a Rural Telecommunications Development Fund. This fund will then provide for the expansion of telecommunications services to the rural areas.

5.5 The Future of Telecommunications in Tanzania

5.5.1 Constraints on Efficiency

Future activities in the telecommunications sector will have to address the following problems currently afflicting the telecommunications network in Tanzania:

1. Severe congestion at the local and trunk exchange levels.
2. A high percentage of faulty equipment and deteriorated external plants.
3. A lack of spare parts and qualified staff.
4. A low level of successful interurban calls (about 25 percent).
5. The length of time it takes to repair a fault (an average of ten days).
6. Incorrect and late billing.

5.5.2 Strategies for Removal of the Constraints

Prior to 1991, the approach to network expansion and to solving the constraints just mentioned was ad hoc and without any clear strategy. Starting in 1991, TTCL has reviewed the existing quality of service and broadly defined the following areas for improvement:

1. Institutional development to ensure efficient and effective management and maintenance.
2. Major rehabilitation and expansion of the telecommunications network.
3. Alleviation of traffic congestion.

A Telecommunications Restructuring Program (TRP) has been conceived to address these issues. The program addresses network expansion and rehabilitation, staff training, and the stocking of spare parts. The program raised revenues from U.S.\$56 million in 1991 to U.S.\$166 million in 1995.

5.5.3 Competition

The licensing of two mobile cellular telephone operators in Dar es Salaam and Zanzibar allowed a private company to break ground for a satellite station and to

put up exchanges that will enable the company to offer telecommunications services in Zanzibar.

Initially, one company offered mobile cellular communications services. The second operator commenced operations later in 1995. The initial tariff was U.S.\$0.4 per minute for local calls. The quality of service was good, although there was congestion between about 9:30 A.M. and noon.

A private company, ZANTEL, was the first to apply for and be granted a license to provide basic telecommunications services in Tanzania. This company provides basic telecommunications services in Zanzibar. It will also provide international telecommunications services using its own satellite earth station. The Tanzania Communications Commission granted ZANTEL its license.

Set up as a joint venture company between the government of Zanzibar and a private company based in Ireland, ZANTEL is responsible for obtaining financing for the implementation of the telecommunications project in Zanzibar. The government of Zanzibar is not required to contribute funding, but it will be able to be an equity shareholder in the joint venture company.

The funds for the project, estimated at U.S.\$25 million, was raised via a combination of the following:

- Medium-term suppliers' credits.
- Support from the Overseas Private Investment Corporation, an organization of the U.S. government.
- Support from the United States Agency for International Development.
- Other participants, comprising local, private, and foreign investment groups.

The ZANTEL network includes the following:

1. An earth station.
2. Digital switching equipment, comprising an international transit exchange and local exchange equipment (10,000 lines) to provide telephone service in Zanzibar.
3. Customer local telephone distribution system using wireless communications technology.
4. Cellular mobile telephone service.
5. Interface and interconnection equipment to enable the ZANTEL network to work with the TTCL network.

The license granted to ZANTEL is more restrictive than TTCL's. It contains the same provisions as TTCL's license with the following special issues:

1. It limits ZANTEL to providing only basic fixed telephone services, meaning that the company cannot provide mobile cellular services or use wireless local loop technology.
2. It confines ZANTEL to offering telecommunications services to customers in Zanzibar and Pemba islands only.
3. International traffic carried by ZANTEL must be from and to customers only in Zanzibar and Pemba.
4. It prevents ZANTEL from offering value-added services.

5.6 Conclusion

Telecommunications services in Tanzania are provided to only a few individuals. The services currently provided are inadequate and poor. A program for an expansion of the service, rehabilitation of the network, and training of staff that has been embarked upon may improve the situation. The liberalization of the telecommunications sector, allowing more operators and service providers, augurs well for the future of telecommunications in Tanzania.

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