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Switzerland's Telecommunication Service and Industry¹

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Large sections of Swiss industry are export oriented. Since the country is poor in natural resources, it must concentrate on manufacturing goods which either require few raw materials, call for a high degree of knowhow and excellence, or entail special development and production efforts. Telecommunications are a typical example of such an industry. Efficient means of communication and an extensive network of national and international links are of vital importance to the country's economy. The telecommunication equipment made and used in Switzerland enables a wide range of services to be offered to satisfy the needs of business and industry, and to facilitate the development and expansion of trade. The *prominent position of telecommunications* and their penetration of Swiss everyday life are best illustrated by the number of 4 million telephones for a population of not more than 6.4 million – a telephone density exceeded only by the USA and Sweden. As for telex penetration, Switzerland's is by far the highest in the world. The many and varied telecommunication services offered are very well used, not least because our rates and charges are among the lowest applied anywhere.

The present standard and capability of the Swiss telecommunication service are the result of several decades' close cooperation of the PTT with the various equipment manufacturers, who have succeeded at each stage in designing and perfecting their products on the basis of new technical developments.

In Switzerland, posts and telecommunications are a Federal Government responsibility. *Swiss Posts, Telephones and Telegraphs* (the PTT) operates the postal, telephone and telegraph services as well as its other electrical communication services on economic principles taking into account the interests of the country as a whole. The PTT's management, The General Directorate, is made up of three Departments: one each for Posts and Telecommunications, and the third for Personnel, Finance and Buildings. The Telecomms Department heads 17 Regional Directorates. The General Directorate is responsible for planning and administration; the Regions for building, operating and maintaining systems and equipment.

The *telecommunication equipment* is supplied and installed largely by private companies. The PTT is not engaged in manufacturing, and concerns itself only with network, system and equipment planning. It draws up detailed performance specifications, but leaves the production of materials and equipment entirely to the manufacturer, thus giving him a free hand in solving the problems put before him. Similarly, the PTT undertakes but a limited amount of research and development, which serves mainly to produce equipment and system specifications and test the performance of the finished product. On the other hand, the PTT concentrates its *research and development* efforts on such areas as telecommunication system concepts, new tele-

comms applications and international standardization where research complementary to that by Swiss industry and the universities is required.

The Swiss, who have a reputation for perfectionism, are extremely demanding *telecommunication customers*. They expect, and are offered, a standard of service matching the proverbial reliability, precision and comfort of the country's other public services. At the same time they are tight-fisted, forcing the PTT to keep its charges to the lowest possible levels. This is also felt by the PTT's contractors, who have to meet correspondingly stringent requirements regarding the quality, durability and easy maintenance of equipment. Prices are decided by the international competitors, against whose tenders those of the home industry are measured. Only if the Swiss and foreign offers are comparable in quality and price will a national supplier be considered. These are the Government's *purchasing regulations*, which are also valid for the PTT. In this way, and not by export subsidies, does Switzerland aim to ensure competitiveness of its products on the world market.

The outlined development and supply procedures presuppose a *high level of technical knowledge* and skill spread over the widest possible area. A steady inflow of able and well-trained young staff to industry and the PTT is ensured by two universities of technology and a large number of technical colleges.

The PTT employs some 15000 *staff* including several hundred certificated engineers and technical officers in the telecommunication service. The country's efficient telecommunication equipment manufacturing industry, which save for some semiconductor components is practically self-sufficient, employs about 11000 personnel. In addition, there are some 14000 staff in the telecomms construction and installation trade.

As a result of the worldwide business recession, which has also affected many sectors of Switzerland's industry, a large *export potential* covering the whole *range of products* is now available in the Swiss companies manufacturing telecommunication equipment. Among the switching systems they offer are public telephone exchanges for local and trunk service, as well as telex exchanges and private branch exchanges of many sizes for connection to the public switched network. A host of modern transmission and multiplexing equipments are available for cable and microwave communication, and a highly diversified terminal apparatus manufacturing industry offers dial and pushbutton telephones as well as a wide variety of special and ancillary equipments for office, factory, and domestic use. In addition, Switzerland produces an electronically controlled teleprinter.

The PTT and industry are at present working on a joint project for a *versatile, electronic telecommunication system* for the late 1980s. It provides for switching and transmission on a digital basis and in integrated form. A working

¹Paper read at the Swiss Expo in Cairo on the Swiss Telecommunications Day (24 November 1976)

model has already been successfully put into operation at Berne. Ultimately, the integrated system will be capable of handling all types of information (speech, data, and pictures). For a small country such as Switzerland, a project of this nature entails a disproportionately large effort, which is necessary, though, to maintain independence and the present high standard of telecommunication engineering.

Two major factors which have contributed to the outlined *popularity of the telephone and telex* in Switzerland are the use of equipments tailored to specific requirements, and efficient methods of operation. Along these lines policy has been shaped since the early stages. The first *automatic telephone exchanges*, for example, came into operation in 1922, and by 1959 subscriber local and trunk dialling was available throughout Switzerland, which thus became the first country to operate a fully automatic national system. Telex was operated manually only at its initial stages, and became an automatic service as early as 1936. Subscriber dialling, together with extensive use of multiplexing on cables and the opening of microwave systems after 1945, made it possible not only to cope with a soaring demand but also to keep charges low despite increasing expenditure on staff, materials and investments.

Automation enabled staffing requirements to be reduced despite heavy traffic increases, and *multiplexing of transmission paths* led to economies in raw materials and investments. Both these measures had a positive effect on the telecommunication accounts, and for a quarter of a century the PTT was able to hand over substantial profits to the Federal Treasury. Heavy expenditure on staff and investments as a result of expansion and inflation in recent years have led the PTT to continue its rationalization policy, but not without carefully balancing costs against savings in each case. *International subscriber dialling*, initiated in the 1960s, has proved a great success with the public. Today, over 90 percent of Switzerland's telephone users can dial their own calls to 45 countries in Europe and overseas with more than 300 million subscribers or 85 percent of the world's telephones. The popularity of this service is illustrated by the fact that at present some 93 percent of the outgoing international calls are subscriber dialled. Similarly, automatic telex service from Switzerland is now available to 67 countries, with 97 percent of calls subscriber dialled. *Automatic access to Switzerland's telecommunication system* is also attractive to our foreign partners since it enables them to obtain any Swiss subscriber direct, either by ISD or by dialling from their operator positions.

A remarkable project carried out in another area has been the *automation of the labour-intensive telegraph service* by a computer system. This has not only slashed staffing requirements, but also accelerated the transmission and

handling of inland and international telegrams, at the same time relieving the personnel of many routine tasks.

A further rationalization project now being put into effect concerns the *telephone service*. Its initial stage provides for the country's 17 *enquiry offices* to be equipped with video terminals connected to a central data bank from which they can call off by means of realtime procedures any subscriber's telephone number and address. This data bank also serves for *directory production* using optical character reading and computer-typesetting.

Microwave links, first erected some 25 years ago, have been increasingly used to boost circuit capacity and back up the metallic trunk network, which today consists mainly of coaxial systems capable of transmitting up to 10800 calls per conductor pair. The microwave radio-relay network now spanning the country carries mainstream traffic between Swiss centres as well as to and from neighbouring countries. About a fifth of the interurban circuits are at present routed over microwave systems. In addition, the microwave relay stations are an essential part of the Swiss *radio and TV* transmission network, which is also operated by the PTT.

All these projects and undertakings represent considerable *investments* and account for the fact that *personnel costs* have dropped to a mere 25 percent of annual telecommunication expenditure. The cost value of telecommunication equipment at present amounts to 11,000 million Swiss francs, which is about 700,000 francs for every employee in the telecommunication service.

The heavy demand for telecommunications prompted the PTT at an early stage to provide *complementary services* such as carradiopaging, which was introduced in 1954. This relatively simple means of radio communication with vehicles uses unidirectional, selective calling to invite a subscriber by acoustic and optical signalling to dial a prearranged number from a nearby telephone. The service, which enjoys great popularity, has also served as a model for a European system.

A further project now in hand is for a *national car radio-phone service* offering the same facilities as the public switched telephone network. It will enable any mobile station to be called from any other fixed or mobile subscriber, and dialled calls to be made to any subscriber at home and abroad. The first section of the network will be opened in 1978, and the remaining sections will come into operation in 1979/80.

Swiss PTT will continue to make every effort to maintain the high standard of its telecommunication service, and to offer its customers up-to-date facilities at attractive prices. It will be actively supported in this by an efficient manufacturing industry.