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Development Meeting on the Manufacture  
of Telecommunications Equipment  
(including low-cost receivers for sound  
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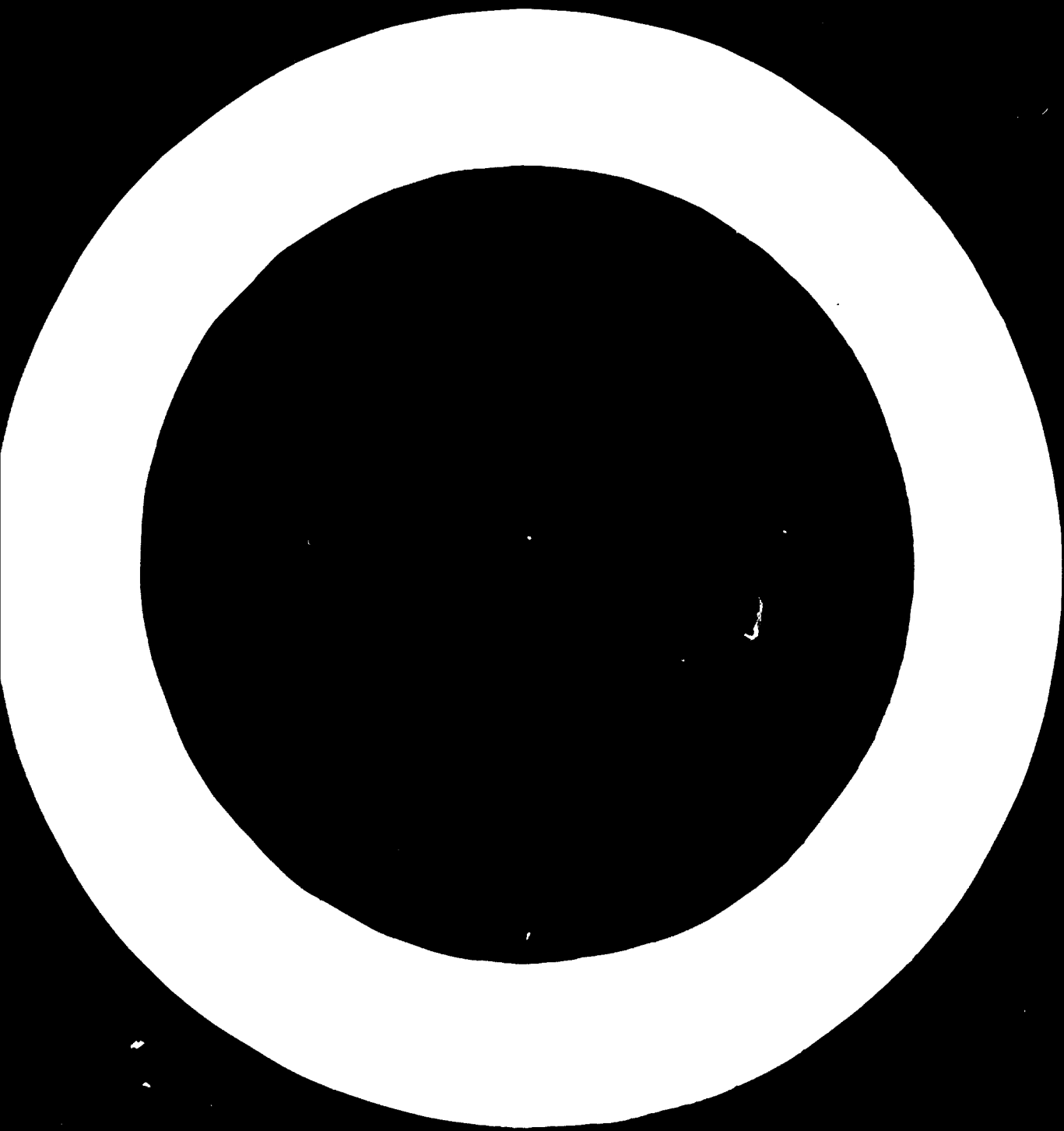
Vienna, 13 - 24 October 1969

REPORT ON THE TELECOMMUNICATIONS INDUSTRY IN TURKEY<sup>1/</sup>

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## Introduction

A stage of development has now been reached to permit us to talk safely of the existence of a telecommunications and domestic electronics industry in Turkey. This is probably the case for a large number of developing nations. Laying the foundation of a new sophisticated industry in a developing country indicates the fact that a beginning has been made to tackle a multitude of economical and technical problems that stand in the way of progress towards becoming self-supporting and up-to-date in that branch of industry. This meeting of experts and officials from developed and developing nations shall certainly provide alternative methods of approach towards the solution of these problems.

### 1. The Present State of The Telecommunications Industry in Turkey.

The main areas of activity are the production of multiplex telephony equipment, telephone exchanges and domestic electronic sets.

A large number of firms ranging from one-man businesses to large companies have been engaged for the last ten years in the production of radio sets and audio equipment, during the last two

years television receivers have also been manufactured and marketed in limited numbers.

Study, design and production of multiplex equipment is carried out by public organizations, mainly the PTT administration. Prototypic design and production has been completed in the last three years and large scale production is expected to begin in near future.

Manual telephone exchanges and telephone sets are being manufactured for the last ten years both by private firms and public organizations. Investment for the manufacture of automatic exchanges and subscriber sets has recently been undertaken in cooperation with a foreign firm with the aim of meeting the entire need for telephone exchanges in Turkey.

## 2. Foundation and Evolution of The Industry.

Factors influencing the foundation of the domestic electronics industry in Turkey have essentially been restrictive import measures taken by the government, rather than purely economical incentives. Increasing demand for radio sets and other domestic equipment could not be met by imports of manufactured products on account of the ever-widening trade gap. Consequently, import of radio sets was allowed only in the form of kits and in limited numbers. Subsequent measures have resulted in reducing the types of imported parts so that at present the share of imported parts is about 40 % of the cost of a radio set. This is also the case for domestic audio equipment. For television sets however, the share of imported parts amounts to about 90 % of the cost of manufacture. Radio transmitters for amateur use with output powers of about 100 watts, have been manufactured in limited quantities.

Transmitters used for nationwide broadcasting are imported as completely manufactured.

Telephone traffic in towns and between towns is increasing at such a high rate that it is not possible to meet the demand by importing manufactured equipment for a country of limited import capability. Relatively large size of the country and rather scattered population calls for modern communication systems of large capacity. This demand shall not probably be met for another thirty years at the present rate of import of manufactured equipment. Privately-owned organizations lack in capital and technical staff to undertake production of this nature. Consequently, PTT Administration was given the task of first studying the feasibility of manufacture of telecommunications equipment and subsequently was allowed sufficient funds to realize the foundation and establishment of the necessary laboratories and plants. Two-channel multiplex equipment for use in the urban areas on the existing open wire lines is in the production line. Prototypes of multiplex equipment to international standards have been completed and production is planned to begin by the middle of the year 1970.

A plant for the production of automatic telephone exchanges and telephone sets is in operation since last year. It is planned that a production capacity of over 20 000 subscriber positions per year shall be reached by the end of the year 1972 and that approximately 70% of the material and equipment used shall be of local manufacture. Half of the investment is made by the PTT Administration and the rest by a foreign firm.

Ministry of Defence conducts a separate program for the study, development and production of communications equipment for the use of the armed forces.

In perspective, the existence of the telecommunications

industry has been suffering because of economical necessities. The present state of operations is being controlled by the availability of foreign exchange, capital investment, qualified personnel and limited market prospects.

Private concerns are concentrated in several areas of the industry that do not require long periods of research and development and which require release of capital. Practically all of the bigger manufacturing concerns have factories and sales outlets with foreign front and wide market for their products under well-established foreign trade channels. Very little research or development is undertaken in the domestic electronics field. At present, annual production is in the region of 400 000 radio sets, 40 000 phonographs, 3000 audio amplifiers and 1000 television sets. The production level for radio sets has been stationary for the last three years while television receiver production shows a trend of 100 % rise every year.

It must be stated with special emphasis that no attempt has yet been made to produce basic circuit elements, that is semiconductors, radio tubes, capacitors and resistors, on account of big capital investments involved and also the lack of specialized experts required for this purpose.

### 3. Economical Feasibility of a National Telecommunications Industry.

The major criterion for making a decision on the economical feasibility of establishing a new branch of industry is the estimated reduction in the value of imports that will be realized as a result of the establishment of this industry.



This is, of course, different from the situation of import restriction usually met in economical affairs. The economies of almost all of the developing nations so far has stagnated external trade as a result of inefficient imports. It is a well known fact that the development of national economies are slowed down and sometimes completely halted by the inability to import from developed countries.

Foundation of a national telecommunications industry is certainly one way of reducing the amount of imports. Alternatively, by importing basic materials and components instead of manufactured products, a significant increase in the quantity of manufactured equipment can be achieved for the same value of imports.

To give an example, it has now been possible to produce three radio sets in Turkey by importing basic electronic components of the value equal to that of one manufactured radio set. The market prices of radio sets however is about 60 % higher in Turkey in comparison to West-European Countries for almost the same quality of product.

In the case of multiplex telephony and telegraphy equipment, it has been calculated that about five times as many equipment can be manufactured by importing components of equal import value to that of a single manufactured equipment. The overall cost of the product is significantly lower than the cost of import from developed countries, even after taking account of research and development costs incurred.

Telecommunications industry, like any other branch of industry, demands both skilled and semiskilled labour as well as specialised technical staff. This has been most welcome, for Turkey has severe unemployment problems like all other developing countries. Local production expenses in the form of wages and salaries have been a direct contribution towards raising the standards of living. It has been observed that telecommunications

and other related industries. These facts are in general agreement with studies conducted on this subject and closely resemble the experiences of other countries.

#### 4. Plans and Policies for the Development of the Industry.

The overall aim is to achieve local production of basic electronic components. There are at present no firm commitments or investments to this end either by the public or the private organizations, although the formation of a components industry is generally regarded as inevitable.

There exists, however, areas of improvement in different branches of the telecommunications industry that must and can precede the establishment of a local components industry.

Domestic electronic industry can well proceed towards becoming economically and technically self-supporting. At present, major manufactures of radio sets and audio equipment represent local operations of foreign firms, although there is always some local participation in the form of capital and administration. Consequently there exists a state of primary dependence on foreign sources both in the technical and economic aspects of the industry. Local companies which operate independent of external sources, have not been able to support the burden of research and development costs because of the existing home competition, and a significant number of them have been obliged to withdraw from the industry. At the moment, there exists no inclination among manufacturers towards a self-supporting radio receiver industry. Government measures to induce enterprises towards this end may well be expected in near future, although it is doubtful that such measures shall be genuinely effective. Turkish radio industry shall not become self-supporting for some time to come.

Modern methods of production that do not call for big investments are being gradually adopted but genuine modernization, such as automation, is not likely to be introduced for a long time.

The situation is different in the case of the manufacture of television receiver sets. This branch of the industry is in the initial stage of development but production could expand in near future. It has been possible to achieve local production of mechanical components as well as coils and transformers required for television sets. Government has been very cautious in allowing the manufacture of television receivers in order to avoid repeating the model of a completely dependent radio industry. Import of components required for production has been delayed both for technical and economical reasons by postponing regular television broadcasting, while experimental broadcasts have been available for several years to enable prototype development by local manufacturers. In addition there exists special government measures concerning the manufacture of television receivers, the main points of which can be summarized as the requirements of at least:

- a) half a million dollar capital investment (in Turkish or foreign currency) ;
- b) five qualified engineers employed in the production ;
- c) 200 square meters of production area.

These requirements prepare the medium and indirectly calls for local research and development work. It remains to be seen as to what extent this will be actually realized.

The level of demand for television receivers is dependent on the foundation of television transmitter stations and the establishment of regular broadcasting. It is estimated that an annual production capacity of 70 000 sets shall be achieved in three years time and production shall entirely meet the estimated demand by that period.

The present public communication facilities are far

from meeting the actual demand. Applications placed ten years ago for the installment of subscriber telephone sets have not still been met in the three largest cities. According to present plans, an annual production capacity of 100 000 subscriber lines shall be realised by the end of 1975 and supply shall meet the demand by 1980. Thereafter, it is expected that the increase in demand shall follow the natural traffic growth, functions is resemblance to other countries. Major part of the components to be used in the manufacture of exchanges and telephone sets shall be of local manufacture. Special components, not exceeding 30 % of the total components in value, shall be imported for several years until their local production becomes economically viable.

Production of multiplex telephony equipment has started this year in the PTT laboratories and plants and about 350 2-wire multiplex terminals shall be put in service by the end of the year. 12 - channel terminal equipment production shall begin next year and 56 terminals is expected to be put into service by the end of 1970. For the following five years, an annual production capacity of at least 100 twelve channel terminals shall be maintained. The equipment produced shall be used in conjunction with the existing radio-link systems on the main routes. Group and supergroup translating equipments required shall also be produced in the PTT laboratories and plants. Prototypes of FM multiplex telegraphy systems are in the stage of preparation.

A new laboratory building with a floorspace 6000 sq. meters shall be available in 1970 and will be used for the design, development and production of multiplex telephony and telegraphy equipment as well as original research. Some theoretical and practical work has already been under taken towards the realisation of PCM systems. Study and design of radio systems is planned to begin after 1972.

The work carried out in the laboratories and on the production line is representative of European standards. All equipment produced conforms to CIEP recommendations.

A separate PTT factory with a floor space of 10 000 Sq. meters shall be in operation in 1970 producing CB-exchanges and a large number of mechanical parts required for PTT use.

The year 1970 marks the beginning of a new era for the telecommunications industry in Turkey.

Government has always been willing to stimulate the progress of the industry by allowing generous tax exemptions and discouraging imports by restrictions and extremely high duties. In addition, there exist possibilities of financial credits to manufacturers who intend to invest in industrial machinery in order to make new products or to improve existing products. A regular expansion of the telecommunications industry is expected during the following years the rate of expansion being controlled by the conduct of the national economy.

#### 5. Recruitment of Technical Staff and Skilled Labour.

Availability of specialised technical staff present a great problem for all new branches of industry, particularly in developing countries. The chances of local recruitment do not practically exist. Such specialists usually opt for work in developed countries where they are also needed, on account of better conditions of employment. It has been observed that progress in many branches of industry has indeed been hampered by the lack of sufficiently qualified and experienced personnel. Fortunately there are institutions of higher education that provide graduates suitable to adaptation to specialised work, after a certain period of training. The developed countries are in a position to help in

speeding up the progress of the industries of developing nations by providing opportunities for the training of the qualified staff. This will also help in the acquisition of modern production techniques. Whether this is acceptable to developed countries is, of course, a different matter.

Experiences in the PTT Research Laboratories have shown that there exists no real shortage of skilled labour. On the job training methods have always resulted in rapid acquisition of required skills whenever necessity has arisen for additional skilled personnel.

#### 6. International Cooperation For the Progress of the National Telecommunications Industries

International cooperation in the technical and economical fields is certainly an effective way of overcoming possible handicaps and speeding up the progress. Cooperation between developed countries and Turkey already exists in the form of factories and special production plants built in accordance to contracts made with individual firms from developed countries. These contracts are usually financed through mechanisms of economical credits. In addition, there exists programs for technical assistance from developed countries in the form of fellowships and technical training opportunities.

It must be stated, however, that cooperations of this kind have essentially very limited scopes as originally envisaged in the contract agreements. A genuine and sound co-operation between a developed and a developing country is as much against the laws of nature as the co-operation of the rich and the poor.

Cooperation between developing nations may prove very profitable to all parties concerned provided that a general political agreement and harmony already exists between these nations.

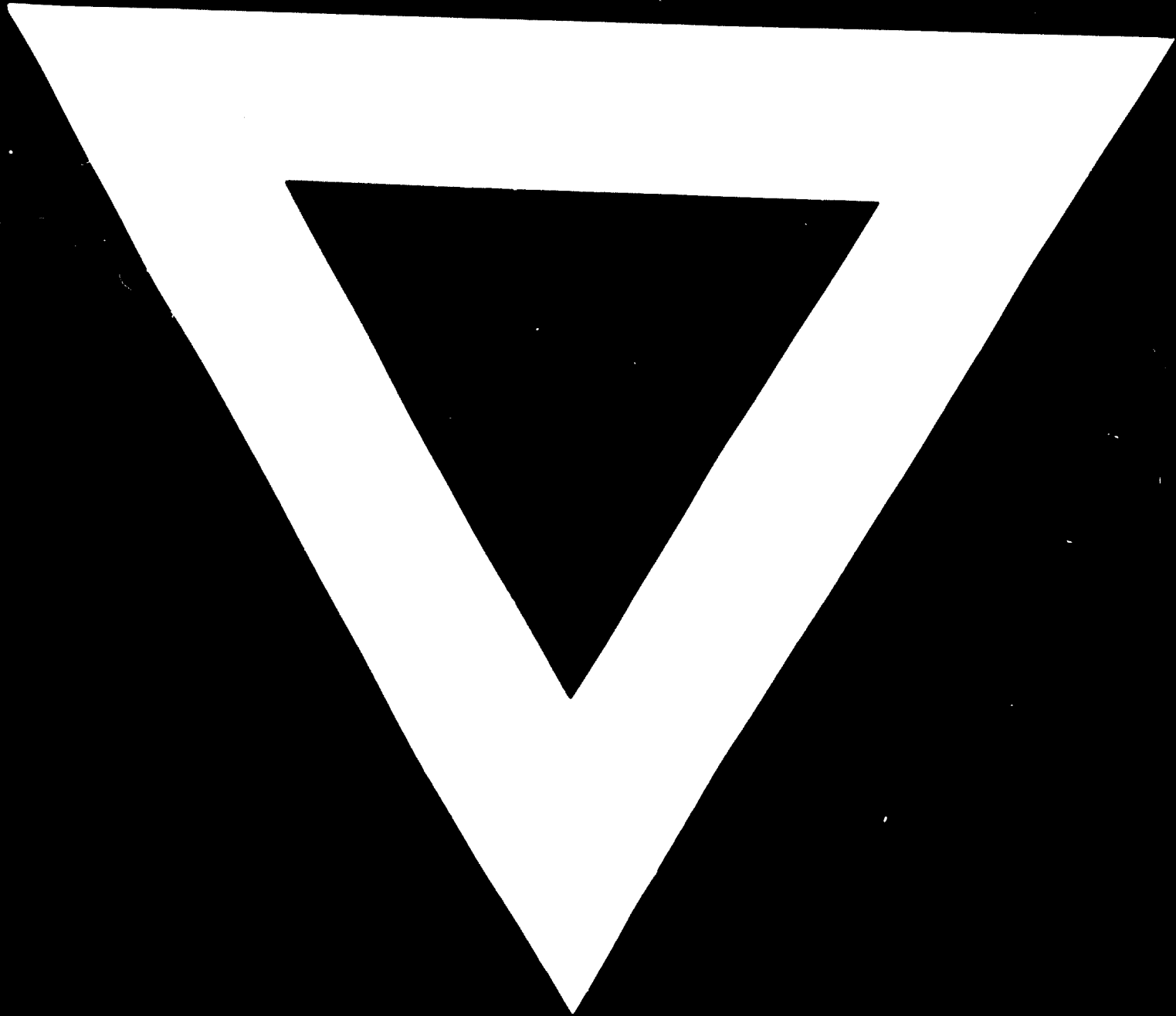
This is essential for the success of any joint enterprise. All aspects of such an undertaking must be discussed in detail at the very outset, as minor points that may have been initially missed may later lead to a disruption of the operations.

Turkey intends to co-operate with Iran and Pakistan on many economical activities. Foundation of a joint electronic components industry is being studied in detail. It must be noted that the overall market potential of the three countries justifies big investments towards the foundation of a components industry.

### 7. Conclusions

This report provides an outline of the present state and the future of the telecommunications industry in Turkey. It illustrates different aspects of the foundation and evolution of an industry and points out the objectives that have been achieved and those that have not. Foundation of national telecommunications industries is essential from the point of view of meeting the rising demands for communication equipment with limited export capabilities. The technical side of such an enterprise can best be discussed during the meeting and an optimum solution can be arrived at for particular countries.





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