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UNIDO Contract n° 74/24
Activity Group n° 1

Project: Development of the Electronics Industry in the Countries of the Andean Group.

n° VC/RLA/73/082 - 30.1.03

Final provisional report (Phase 1°)

Revised Edition

Carried out by:
Luigi Vianello, engineer - CITACO -
Head of the Advisory Unit
Electronics Sector
and,
Leone Irnerio Vedeli
Economist Consultant

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C O N T E N T S

Contents (ctd)

Notice:

In this report, the contracting organisations, as well as the other firms that will eventually be mentioned, shall be indicated by their abbreviated initials or other corresponding names, as follows:

- United Nations Industrial Development Organisation	- UNIDO
- Junta de l'Acuerdo de Cartagena	- JUNTA
- Corporación Andina de Fomento	- CAF
- The consulting contractor	- CITACO
- The advisory unit in the project area	- MISSION
- The Andean Group Countries	- SUBREGION

INTRODUCTION

THE AIM OF THE PROJECT

The object of the technical assistance project in the Sub-region, which is mainly covered by UNIDO contract nº 74/24, would be the supply of the necessary consulting apparatus to the JUNTA and the CAF and through them, to the Governments, upon their request, for:

- preparing a Sub-regional planning of the electronics industry
- preparing Techno-economic feasibility studies and
- establishing and or developing the production facilities in the electronics sector, for the following products and their active and passive components:

1). Telephone equipment.
2). Telecommunications equipment (by telegraph and telex).
3). Radiocommunications equipment.
4). Navigation aids equipment.
5). Complementary equipment for sound broadcasting and for Television studios.
6). Electromedical equipment.
7). Equipment for industrial electronics, measuring and control.
9). Professional equipment for private use (telephone answering, paging, teaching equipment, other).
10). Electronic office equipment.
11). Consumer electronic equipment for domestic use (radio & TV receivers, amplifyers and other equipment).

Contract Structure

In oder to satisfy the aims of the project, that is technical assistance to CAF, the UNIDO contract assigns to the Mission a task subdivided as follows:

Phase 1

Initial support to CAF in the Preliminary work for the promotion of the Electronics Sector Programme in the Sub-region.

Phase 2

Promotion, Implementation and Supervision of specific industrial projects in the Sub-region.

The contract also states that Phase 2 should start as soon as the Regional Programme of the sector is approved by the Cartagena Agreement Commission, and CITACO will need a formal approval by UNIDO.

Execution of the contract

The events that have occurred in the Sub-region during the implementation of Phase 1 (events that have been immediately examined by the Mission's Steering Committee, at its headquarters in Caracas and reported to UNIDO in the documents: Initial Report 18.X-15.XI.1974 and Work Progress Report 18.III.1975) have rendered necessary:

- several modifications in the work performed during Phase 1,
- the postponment to an undefined date of Phase 2, due to the delay of the approval of the Sectoral Regional Programme. This has required the interruption of the Mission's work, as agreed during the 3rd meeting of the Mission's Steering Committee on March 17, 1975 in Caracas, following a formal request of CAF.

The present Report is the Final Provisional Report of the work performed in Phase 1, as required in para 2.09 f) od the UNIDO-CITDCO contract.

FOREWORD

MISSION SCHEDULE

1. The Mission has been working at the CAF Headquarters in Caracas according to the schedule illustrated in diagram P.1 to which the following notes refer:

1.1. - 1. Arrival of Mission on field

The Mission began its work on 18.X.1974 when the Head of the Advisory Unit, Mr Luigi Vianello, arrived, following the briefing at the UNIDO Headquarters held in Vienna on 11.X. 1974.

1.2. - 2. Documentation study - Work Programme

3. Initial Report to UNIDO

4. 1st Meeting of the Steering Committee

The first part of the Mission's work (represented only in the person of the Head of the Advisory Unit) culminated in the 1st Meeting of the Steering Committee (11.XI.1974) and the furnishing of the Initial Report (15.XI.1974). This Report set out the work carried out during the first month, and showed the terms of the Work Programme which, in view of the operational limitations that had come to light, had been entrusted to the Mission.

The Work Programme, therefore, hinged around two main actions:

a) attending the Electronics Experts Conference in Lima;

b) making an investigation tour to the Subregion.

1.3. - 5. Electronics Experts Conference in Lima

6. Investigation Tour to the Subregion

These were both performed between 15.XI. and 20.XII. 1974; this Mission was composed of one CAF official counterpart, Mr Francisco Lira, and of Mr L. Vianello.

1.4. - 7. Trip Report Preparation

Observations, information and impressions gathered at the meetings with government representatives and members of industrialists' associations belonging to the sector, led to the suggestion that the Mission's tasks should modify their approach.

The report on the trip to the Andean Subregion was drafted jointly by the two above-named officials, and is given in the second part of the report.

1.5. - 8. 2nd Meeting of the Steering Committee.

The second meeting was held on 13th and 15th January 1975 (please see the first part of the Annex A and the 1st Performance Report to UNIDO).

Noting that it was impossible for the Mission to proceed along the lines outlined at their first Meeting, the Steering Committee agreed to a study trip to Italy, and added the recommendation that an alternative CAF assistance plan should be drafted at the same time, recognizing that the original objectives of the contract were no longer feasible.

1.6. - 9. Arrival of the Economist on field

On 18.I.1975, in accordance with the provisions of stage 1 for Technical Assistance to CAF, a Consultant Economist took up his post in Caracas: it was Professor Leone Iraci Fedeli, socio-economics expert on developing countries and Professor

of Industrial Economics and Economic History at the "Gran Colombia" University, Bogotá.
In order to get a complete picture of the Andean socio-economic situation to serve towards a better understanding of the problems inherent in sectorial planning having CAF's objectives in view, the Economist was given the task of making a socio-economic survey of the Andean Sub-region, considered as a single unit, and to identify areas of socio-economical anomalies, indicating also possible relevances on probable industrial activities.

1.7. - 10. Study tour to Italy

The one month trip programmed for a CAF member (Mr. F. Lira) has been carried out visiting Italian Electronic Organizations and industrial establishments.
The results of the tour, that lasted from January 1 to February 15 1975, have been explained in a condensed report prepared by the above mentioned CAF officer, and enclosed under Annex B.
The Head of the Advisory Unit has at all times accompanied the guest, and one officer from STET - Electronic and Telecommunication Holding Company, of the IRI Group - has taken care of the tour schedule and organization.

1.8. - 11. First Performance Report to UNIDO

The report, submitted to Unido at the end of February 1975, describes, following a time sequence, the steps taken in carrying on the work and details in a series of additional notes, the most relevant facts occurred and the forecast for the ending of the first phase.
In the notes at the end of the report the mission draws the attention of UNIDO to the fact that the lack of adequate logistic and operational support provided by CAF jeopardises the aim and the outcome of the Mission's work.

In the light of article 3.00 of the Contract an intervention on the part of UNIDO is therefore requested.

No.	Description of activities	
	… or field	
	… program	
	[illegible]	
	… Committee	
	…	
	…	
	…	
	… Committee	
	… or field	
	… y	
	… to …	
	… to Italy	
	… of the Steering Committee	
	… Report	
	… mission from field	

NOTE

DATA	APPROVATO	REV

1.9. - 12. Report of the study tour to Italy

This report was to be drafted by a CAF member (art.2.09.e of the contract), and was supplied in summary form as a series of detailed notes now in the hands of CAF. The report is given as Annex B.

1.10. - 13. 3rd Meeting of the Steering Committee

The Memorandum of this meeting is given in Annex B. The resolutions passed by the Committee have already been given in the Introduction: essentially, they are a) that they note the lack of the necessary community programming for the electronics sector, and b) CAF requests that the Mission should suspend all work on the 2nd stage.

1.11. - 14. Provisional Final Report

This was drawn up by the above-mentioned two-man Mission. Basically, the report details the work carried out in the manner, times and limitations already referred to, and taken up again in the following chapters and the Annexes.

1.12. - 15. Leaving of the Mission from Field

The Mission halted its work in Caracas on 16.IV.1975. Briefly, the Mission which comprised the Head of the Advisory Unit and a Consultant Economist, carried out the tasks assigned to it for a total of 9 man/months, travelled throughout the Andean countries for 5 weeks, and carried out a 4-week study trip to Italy : it received official recognition from CAF for the satisfactory result of the assistance rendered, relative to the tasks it had undertaken to perform.

RESULTS OBTAINED

1. Despite the uncertainty caused by the foreseeable deferment of the Sectorial Programme for the Electronics Industry in the Subregion, the Mission managed at all times to re-schedule its work on the basis of the decisions made by the Steering Committee as the need occurred.

Working closely with their CAF counterpart members, the Mission managed successfully to perform the tasks in the spirit of the assistance required of the Mission, namely:

1.1. The recognition of the general problems that typify the commercial and preofessional electronics industry.

1.2. The drafting of the socio-economic aspects of the sector, connected with the aspects dictated by Subregional policy.

1.3. The recognition and recording of the conditions prevailing in the subregion, and of the elements necessary to launch or boost the industrial and infrastructural activities belonging to the sector.

1.4. A thorough survey of the state of progress made in the technologies, production techniques and organizational structures which typify the sector. This was done by making careful inspection visits to Italian companies and bodies operating in the electronics and telecommunications sector; this gave them the necessary terms of reference by which to compare data, and lay the basis for a rational assessment of the efforts required to set up feasible pre-determined levels in the similar, and emerging, industry of the Subregion.

The present report, therefore, is the Final Report on the work of the 1st stage with the modifications made to the provisional edition submitted originally to UNIDO for examination; it contains all the elements of information that were gathered and examined in the light of the developments in the programming of the sector being undertaken by the decision-making bodies of the Andean Community.

PART 1

CHAPTER IV. SOCIO/ECONOMIC PROFILE OF THE SUBREGION.

IV.1. GEOGRAPHICAL SITUATION, SURFACE AREA AND POPULATION

The Andean Subregion, formed by the six countries which are signatories to the Cartagena Agreement (Venezuela, Colombia, Ecuador, Peru, Bolivia and Chile), consists of the northwestern part of the South American Continent, stretching from the eastern border of Venezuela to the extreme south of Chile. It includes all the countries lying along the Pacific sea-board, as well as Colombia (which lies on the edge of both Oceans), and Venezuela.

The region reaches from the northernmost point to the extreme south of the continent of South America, including all the territories which are geographically Andean, the coastal plains and important areas of the Amazon Basin, in addition to the Orinoco Basin and the Venezuelan part of the Guyana Massif.

The Andes chain includes temperate and cold regions, with non-tropical agriculture and livestock, as well as high altitude areas over 5 000 metres - in other words, areas which lie above the snow-line in equinoxial latitudes.

The geographical conformation and the population features have caused the large towns and cities to be built at high altitudes. Three of the capital cities of the Andean countries stand at over 2 500m a.s.l.: Bogotà at 2 590m, Quito at 2 600m and La Paz 3 800m. With the exception of Chile and Venezuela, most of the people in the countries in the Subregion inhabit high altitude areas.

Even though this breakdown is necessarily imprecise, since it does not follow the administrative boundaries of homogenous areas, one could estimate that the population figures for the non-tropical zones are: 50% in Colombia, 60% in Ecuador, 60% in Peru and 80% in Bolivia.

The term "Subregion" is used in relation to the term "region" which, in the terminology of international organisations, stands for the whole of South America - in other words, the conventional historical sense of the word. This meaning is also taken to signify all of the countries lying south of the United States to include countries which do not speak a Romance language, such as the Antilles where English and Dutch are spoken, the Guyana Republic (formerly British Guayana), Surinam (formerly Dutch Guayana) and the Falkland and Malvinas Islands.

The subregion accounts for approximately 24% of the surface area and 22.5% of the population of the South American Region. The following table shows the surface area and the population of the subregion, and of the whole region, compared with certain other South American countries not forming part of the subregion.

TABLE 1 - Surface area and population of the Andean Subregion compared with Latin America as a whole, and with certain South American countries.

	Surface area in thousands of km^2	Population in millions	Density: inhabitants per km^2
Subregion	5,445	76.5	18.2
Latin America	22,600	340.0	15.5
Brazil	8,512	108.03	14.0
Mexico	1,967	58.3	28.0
Argentina	2,778	25.8	9.0

As the figures show, the six countries taken together represent a unit of comparable importance to the large countries of Latin America, and one which is a significant part of the region. The following table shows the sizes of the large Latin American countries compared in percentage terms to the Subregion:

TABLE 2 Surface area, population and density of the Subregion, compared to the region as a whole and to certain Latin American countries.

		Surface area	Popln.	Density
Proportion of the Subregion compared with:	Latin America	24.0	22.5	94
	Brazil	64.0	69.6	101
	Mexico	272.2	132.0	59.2
	Argentina	194.2	306.0	155.5

The Subregion comprises six countries, varying in area and population. Although differences exist, they are not as wide as those existing between other groupings, and this can be taken as an element of stability. The following table gived the surface area, population and density of the six countries of the Subregion.

TABLE 3 Surface area, population and density of the six countries of the Andean Subregion.

Country	Surface area	Population	Density
Colombia	1,139	24.7	20.8
Chile	757	10.6	13.3
Ecuador	271	7.2	24.0
Bolivia	1,099	5.6	4.8
Peru	1,280	15.9	11.6
Venezuela	899	12.5	12.6
Subregion	5,445	76.5	10.5

Trend towards integration before the setting up of the Andean Group

The creation of the Andean Group was originally dictated by the necessity, as observed by researchers and international organisations, for supranational groupings to constitute a sufficiently large market even for very small industries [illegible], and despite the relatively low per capita incomes. These conclusions were already circulating in the fifties in connexion with the realisation that the deterioration of the terms of trade in basic commodities needed an alternative solution to the preexisting structure of primary export economies.

It is probable that in the well-known CEPAL theses drawn up in the fifties, they had overestimated both the permanent and almost inevitable nature of the deterioration in the terms of trade in basic commodities, as well as the fact that the Latin American countries are primary export markets. At all events, there is no doubt that the recognition of the rational nature (in terms of alternative cost) of an import substitution industry, and at the same time of the limited extent of industrial investment in the national markets contributed greatly to creating the climate in which the tendencies towards integration became politically acceptable.

The economies of Latin America had always been based on an export-minded philosophy, and the great period of economic development (which in some countries was very rapid roughly between 1880 and 1929 was identified with a process of outward growth. During this period even industrialisation induced by an increase in exports and the resultant increase in home demand (which is substitutive of potential imports) was relatively low, even when in theory it was privately convenient, because they under-estimated investment opportunities, because of the premature and generally irrational development of the tertiary sector, and possibly to a certain extent because of deliberate opposition on the part of importers-though less than one often is inclined to believe.

Perhaps they also overestimated the generally accepted attitude of the Latin American culture during the golden period of primary exports as being uninterested in the industrial "vocation" of the various countries. Even in a favourable

market situation, and on the basis of the economic theory current at that time, it was clear that the trend was leading towards decreasing revenue from basic commodities and towards the reduction, in industrialised countries, of the elasticity/rate of demand for basic commodities; they also neglected to take account of the technological changes that were to reduce the raw material content of industrial commodities, and the competition from more under-developed regions, such as Asia and Africa.

In any case, it is a known fact that on the eve of the 1929 crisis the most vital sectors of the Latin American market economy were geared to the markets of the industrialised countries (that is to say, almost exclusively to western Europe, since the United States became a basic commodity importer much later on), and trade between the countries of Latin America was of very limited importance. The balance of payments difficulties in the wake of the collapse of the international markets, and the difficulties in obtaining industrial commodities during the Second World War encouraged the substitution of industrial imports and also, in part, of agricultural imports (e.g. wheat in Brazil, sugar in Chile, cotton in Argentina and later in Colombia etc) and, in part, market substitution.

The first experience of subregional integration was carried out between the small countries of the Central American isthmus where their national markets were clearly inadequate to face industries in highly developed economies.

Despite the fact that the isthmus countries exported virtually all the same products, the idea of setting up an import substitution industry for the whole subregion led, in 1951, to a resolution passed by the governments of the five countries, Guatemala, El Salvador, Honduras, Nicaragua and Costa Rica, favouring integration. In 1958, following several bilateral treaties, a multi-lateral treaty was drawn up for free trade and economic integration, and at the same time, a convention was signed to govern Central American industries, to ~~assign~~ allocate the new industries. In 1959, the free trade area became a common market, when the Central American Convention was signed to handle the harmonisation of import duties, and in 1960 the market was totally unified, giving free movement not only of goods but also of capital and labour.

As a result of these measures, trade between the countries of the subregion of Central America rapidly expanded at an annual rate of 21% between 1950 and 1967, and of 35% between 1961 and 1967. Trade between the countries of the Central American subregion, which in 1951 had been almost negligible (8.6m dollars, which is only 4% of the total) had grown by 1967 both absolutely and relatively, to reach 25% of the total trade ~~representing~~ amounting to 280m dollars - 25 times more than the previous level.

The following table shows the ~~trade curve~~ marking development of trade in the Multilateral Treaty countries between 1960 and 1967.

TABLE 4: External and intraregional trade of the countries of the Central American isthmus, in millions of dollars.

	1960	1963	1965	1966	1967
Traditional exports:					
Cotton	36.7	104.6	144.4	131.5	1174
Bananas	66.3	70.1	84.7	109.3	116.0
Coffee	212.0	229.8	282.0	284.5	244.3
Intraregional exports:	32.7	66.2	136.0	176.3	220.0
Total	430.0	590.2	772.2	883.5	845.3
Percentage of Intraregional exports:	7.6 %	11.2 %	17.6 %	20.9 %	26.0 %

Source: CEPAL - Economic Survey of Latin America 1965 id. Economic Survey of Latin America 1967

During the period under review, the process of integration in Central America would appear to have favoured a relatively high rate of growth. The following table shows the evolution of the gdp of the countries of the Central American isthmus (except Panama) during the sixties:

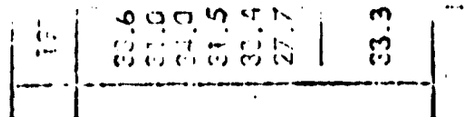


TABLE 5: Increase in the Gross Domestic Product of the Central American countries, 1960-1967 (in millions of dollars)

	GDP in 1960	Annual % rate of growth 1960-65	1965-66	1966-67
Guatemala	1,094	6.4	4.5	3.4
El Salvador	698	6.6	5.7	3.4
Costa Rica	568	6.1	6.5	8.3
Honduras	406	5.7	4.7	3.5
Nicaragua	359	8.3	3.8	3.8
Central America	3,125	6.6	5.0	4.3

Sources: CEPAL Economic Bulletin of Latin America, Oct.1967
CEPAL Economic Survey of Latin America 1967

I.2 Formation and Evolution of the Andean Group

As already mentioned, the idea that has been widespread over the past 50 years, that market limitation was a fundamental obstacle to industrialisation, has helped to create attitudes favouring the creation of free trade zones.

ALALC (Latin American Free Trade Association) was set up at the beginning of 1960 with the signing of the Montevideo Treaty between Argentina, Brazil, Chile, Uruguay, Mexico, Paraguay and Peru. Colombia, Ecuador, Venezuela and Bolivia later joined them, and in 1968 it comprised all the countries of South America with Mexico.

The results were, however, limited. ALALC was not a common market; it lacked the means to unify protection from outside, and it did not even manage to become a free trade area, as it limited its actions to lowering commodity tariffs by partly revocable concessionary measures.

The following table shows the evolution of trade between the ALALC countries in the sixties:

TABLE 6. Evolution of trade between the ALALC countries. FOB value of exports in millions of dollars.

	1953-55	8959-61	1965	1966	1967
Argentina	205	133	231	243	171
Brazil	133	86	197	161	
Colombia	3	5	16	29	15
Chile	59	35	53	54	60
Ecuador	9	7	13	13	19
Mexico	5	6	36	57	87
Paraguay	13	9	17	20	16
Peru	50	37	54	52	35
Uruguay	29	4	16	27	17
ALALC Total	508	321	635	675	691

As the table shows, not only did the trading figures of the ALALC countries remain at a limited level, but also the rise in exports from each country towards the rest of the Association remained rather low, with the only insignificant exception of the countries which had previously had little trade with the other ALALC countries, and which in any case did not affect the overall trade situation to any great extent.

The following table shows a comparison between the value of exports in 1967 and those at the beginning of the sixties:

TABLE 7: Indices of exports from the ALALC countries to other member countries in 1967 (the 1958-61 average=100).

Argentina	173
Brazil	219
Colombia	320
Chile	150
Ecuador	185
Mexico	600
Paraguay	188
Peru	146
Uruguay	800
ALALC Total	198

The absence of any external protection policy made it impossible to modify significantly the commercial framework that had been established during the process of "outward growth", and prevented regional complementation.

The following table shows the trade share with other ALALC countries, expressed as a percentage of total exports, as it was in the mid-sixties.

TABLE 8: Exports to other ALALC countries, expressed as percentages of the total volume of exports, 1965.

Argentina	15.0%
Brazil	12.2%
Colombia	3.0%
Chile	5.0%
Ecuador	0.9%
Mexico	2.8%
Peru	9.9%
Uruguay	8.0%

The limited results achieved by the regional free trade area encouraged the trend towards the creation of a subregional common market.

The Andean Group was set up by the countries in which market limitations were evident and in which, at least in the case of Chile and partly of Peru and Colombia, the initial and easiest stages of imports substitution had been overcome.

The Group was created with the membership of Chile, Peru and Colombia, and the subsequent membership of Ecuador, and Bolivia, and in 1973 with Venezuela.

The agreement envisages a liberalisation of trade, particularly of commodities which are not yet produced in the subregion, and at the same time the unification of external protection.

The Group was formed by countries which did not engage in significant ~~mutual~~ reciprocal trade, countries which already

had a per capita income level which was not very low (with the exception of Bolivia and Ecuador) - the so-called "semi-developed countries", rather than underdeveloped countries as such - having a relatively diversified industrial structure.

When Venezuela joined, with its large amount of natural resources and a per capita product which greatly exceeded the subregional average, the Andean Group grew in importance within the region as a whole, since the volume of external trade of the Andean Group was greater than that of any single Latin American country as a result.

The accession of Venezuela to the subregional group was carried out formally by the documents known as the Lima Agreement (Consenso de Lima): the first document, Additional Instrument to the Cartagena Agreement for the Membership of Venzuela (Instrumento Adicional al Acuerdo de Cartagena para la Adhesiòn de Venezuela) partially modified the abovementioned Agreement; the other document, Decision 70 of the Agreement Commission, laid down the stages, procedures and other terms for Venezuela to adjust to the decisions previously adopted by the Agreement Commission.

The modifications to the Agreement can be summarised as follows:

1. Enlargement of the number of cases in which the countries concerned may use the power of veto in matters concerning the approval and application of common external tariffs and other decisions.

2. Permission for Venezuela to be exempted from the liberalisation measures for certain commodities; accordingly,

the other countries are empowered to apply certain provisos to the liberalisation of imports to Venezuela.

Decision 70 lays down the stages through which Venezuela shall adjust to the tariff arrangements, laying down the procedures towards reaching a common external tariff to come into force in 1975.

With reference to the Sectorial Development Programme for the Metal Engineering Industry (Programa Sectorial de Desarrollo de la Industria Metalmecanico) drawn up as a result of previous decisions, it was decided that within six months following the membership of Venezuela, the Junta would furnish the Commission with a complementary proposal regarding such decisions so that Venezuela could also take part in the programme; however, the inclusion of Venezuela would not affect the previous assignments laid down.

In 1973 Venezuela passed the Law of Accession and enforced some of the decisions taken by the Andean Group.

CHAPTER II. THE SUBREGIONAL SITUATION IN THE EARLY SEVENTIES

II.1 Socio/economic indicators in the Junta's survey: population

The Junta de Acuerdo de Cartagena's Survey entitled "Grupo Andino. Algunos indicadores socioeconomicos" (J/PR.Rev.2. 195 November 1974) ("The Andean Group: some socio/economic indicators") presents the basic data regarding the socio/economic situation of the Subregion as it was before the changes in the world market in 1973. We feel it would be useful to mention here a few comments on the situation in what is known as the last "normal" year, together with the trends which flow from this data.

Clearly the most important aspect of this information is first of all the fact that it contains the data given by national sources in terms which are homogeneous within the subregion, thus making it possible to draw significant comparisons from them.

Below are tables taken from their survey, together with notes and comments.

We are following the order that was followed in the examination of topics - an order which is not necessarily the one used in the Junta's survey (which will henceforth be called indicators) and will be using elements taken from different tables: the numbering of the tables will be the one used in our study, and in brackets the page and table number of the indicators will be given. Sources of data used in the indicators will be found in that publication, and not mebtioned here.

II 4.2 Size, rate of increase and age-grouping of the population 1968-1972

The following table gives the population figures for the different countries of the subregion as a whole, during 1968-72.

TABLE 9. Population of the Subregion, 1968-72 (in thousands).

País	1968	1969	1970	1971	1972
Bolivia	4.680.6	4.803.9	4.931.2	5.062.5	5.194.9
Colombia	19.830.4	20.464.8	21.117.8	21.793.8	22.890.5
Chile	9.297.0	9.505.0	9.717.0	9.905.0	10.088.0
Ecuador	5.776.1	5.973.3	6.177.1	6.389.2	6.598.3
Perú	12.037.4	12.402.1	12.784.2	13.184.6	13.567.9
Venezuela	9.621.9	9.943.6	10.275.1	10.721.5	11.149.9
Subregión	61.243.5	63.092.3	65.002.4	67.051.6	69.089.5

Source: ~~Indicadores~~ Indicators, Table D-1 p.4.

This data shows a very steep population rise: over four years it rose by approx. 11%.

The following table gives the birth-rate, death-rate and natural ~~same~~ increase during the same period.

TABLE 10: Birth rate, death rate and natural increase 1968-70 (per 1,000 inhabitants).

Country	1968	1969	1970	1971	1972
Bolivia					
Births	38.4	38.4	39.6	39.8	39.6
Deaths	19.4	19.0	13.1	18.1	18.1
Increase	19.0	19.4	26.5	21.5	21.5
Colombia					
Births	31.4	...	...	36.6	...
Deaths	10.6	10.6	9.5	9.5	9.0
Increase	20.8	20.8	21.9	27.1	27.6
Chile					
Births	29.4	27.7	26.9	25.9	25.9
Deaths	9.1	8.9	8.5	8.1	8.1
Increase	20.3	18.8	18.4	17.8	17.8
Ecuador					
Births	39.6	37.4	37.8	38.7	37.3
Deaths	10.8	10.9	9.9	10.1	10.3
Increase	28.8	26.9	27.8	28.6	27.0
Peru					
Births	41.6	41.8	39.8	39.8	39.8
Deaths	11.1	11.1	8.8	8.8	8.8
Increase	30.9	30.7	31.0	31.0	31.0
Venezuela					
Births	80.0	39,9	38.2	38.3	38.0
Deaths	6.7	6.8	6.7	6.6	6.7
Increase	33.3	33.1	31.5	31.7	21.3
Subregion					
Births	37.2	23.3	33.8	36.6	36.9
Deaths	9.3	8.2	9.0	9.4	9.2
Increase	28.9	15.1	24.8	27.2	27.7

Sources: Indicators, Table D-1 p.8 (population), table D-2 p.9 (deaths), Table D-3 p.6, (births). The subregional rates are calculated on the basis of weighted averages. Where no figure is available for any one year, the previous year's rate has been used.

These figures are very significant. As everyone knows, there was a widespread opinion held for a long time, and one that is still current in part, that there was a close negative relationship between the level of per capita income and the birth rate. Moreover, it was assumed that this relationship was much more telling than between the level of development and the death rate, so that it was believed that increasing per capita income would lower the rate of population increase.

According to this thesis, the population explosion is a non-problem since the very process of development had reduced the rate of population increase.

Even with a population increase rate which falls well below that currently existing in the subregion (2.7%, and one of the highest in the world and above the average of the developing countries), one must stress that fears of an unmanageable population growth have not come to pass. This applies both when compared with different countries over the same time-period, as well as the same countries in different periods of time.

As the table shows, Venezuela, during the whole period, with a per capita income which is higher than the subregional average, has had practically the same birth-rate as Bolivia, and having a lower mortality rate for most of those years, it has a higher population growth rate.

In the same way we see no significant drop in the birth-rate during this period, despite a significant rise in per capita income; in Bolivia, and Colombia it actually rose.

It is unnecessary to emphasise the extent to which recent and wideranging studies on "growth limits" have shown that as population trends stand at present or even with a slightly lower population growth rate, no increase in output would be able to guarantee acceptable living standards in the comparatively near future, even in countries that currently enjoy a high standard of living.

The fact is that in the Subregion, the make-up of the population by age-groups suggests that the present population growth rate will increase if the present trends continue.

The following table shows the Subregion population divided according to age-groups, based on the most recent figures available:

TABLE 11. Percentage structure of the population by age-groups around 1972.

Age groups		0-4	5-9	10-14	15-19	20-24	25-29	30-34	OVER	0-19
Bolivia	1970	16.9	13.8	11.8	10.1	8.6	7,8	6.5	24.3	52.6
Colombia	1972	17.6	16.0	12.8	10.1	8.1	6.6	5.9	22.5	56.6
Chile	1970	14.1	13.3	11.9	10.2	8.5	7.3	6.3	28.4	49.5
Ecuador	1972	18.5	15.6	13.2	10.7	8.6	6.8	5.5	21.4	58.0
Perú	1970	17.4	14.8	12.7	10.2	8.6	7.1	6.0	22.9	55.1
Venezuela	1971	16.1	15.4	13.6	11.4	8.9	6.5	5.4	22.3	56.5
Subregión		16.7	15.2	12.9	10.4	8.4	6.8	5,8	23.4	55.2

Source: Indicators Table D-4 p.7.

These figures show that contrary to what many people think, (in Europe rather than in America where it is rather a matter of feeling than of absolute conviction), the Subregion does not have a predominantly rural population. In 1968 the rural population was already in the minority, taking the Subregion as a whole (41.7%, or approx. the same percentage as in any average developed European country like Italy in the early fifties), and was in the majority only in the least relatively developed countries countries, Bolivia and Ecuador. But even in these countries the rural population at the end of the period in question had dropped to a significant degree.

This situation is evidently the result in part of an increasing urban margination, and in part it is due to an abnormally low activity rate (proportion of working population to total population) which itself is partially the result of the structuring based on age-groupings.

I 6.3 Population structure and employment figures.

The aplit into rural and urban population shows that throughout the subregion there is a level of urbanisation which is far above the level which existed in the countries that are industrialised today, at comparable development levels; it also shows that the flow towards the towns has continued over these years, despite the fact that there is nowhere near full employment in the towns.

The following table shows the rural and urban population in the countries of the subregion.

TABLE 12: Rural and urban population (per thousand inhabitants, and %)

Country	1963	%	1969	%	1970	%	1971	%	1972	%
Bolivia										
Total	4,680.6		4,803.9		4,931.2		5,062.5		5,194.9	
Rural	3,079.9	65.8	3,131.5	65.6	3,180.6	64.3	3,235.0	63.9	3,288.4	63.3
Urban	1,600.7	34.2	1,671.4	34.8	1,750.6	35.5	1,827.5	36.1	1,906.5	36.7
Colombia										
Total	19,830.4		20,464.4		21,117.8		21,793.8		22,490.5	
Rural	8,346.3	42.0	8,369.5	40.1	8,404.8	39.8	8,434.2	38.7	8,478.9	37.7
Urban	11,494.1	57.9	12,103.9	59.1	12,723.0	60.2	13,359.6	61.3	14,021.1	62.3
Chile										
Total	9,297.0		9,509.0		9,717.0		9,905.0		10,088.0	
Rural	2,863.4	30.8	2,861.0	30.1	2,876.8	29.6	2,882.4	29.1	2,885.1	28.6
Urban	6,433.6	69.2	6,644.1	69.9	6,841.0	70.4	7,022.6	70.9	7,202.8	71.4
Ecuador										
Total	5,776.1		5,973.3		6,177.1		6,384.2		6,598.3	
Rural	3,451.7	59.8	3,529.7	59.0	3,597.6	58.2	3,677.2	57.6	3,757.5	56.9
Urban	2,324.4	40.2			2,579.5	41.8	2,707.0	42.8	2,840.8	43.1
Peru										
Total	12,037.4		12,402.1		12,784.2		13,184,6		13,567.9	
Rural	5,322.4	44.7	5,382.4	43.6	5,433.1	42.5	5,458.6	41.4	5,481.2	40.4
Urban	6,699.0	55.3	6,994.4	56.8	7,726.1	58.6	7,726.0	58.6	8,086.6	59.6
Venezuela										
Total	9,621.9		9,243.6		10,275.1		10,721.5		11,149.9	
Rural	2,434.3	25.3	2,485.9	26.0	2,548.2	24.8	2,632.0	24.6	2,720.6	24.4
Urban	7,187.6	74.7	7,957.7	75.0	7,726.9	75.2	8,089.4	75.4	8,453.4	75.6
Subregion										
Total	61,243.5		63,092.3		65,002.4		67,051.6		69,089.5	
Rural	25,978.0	41.7	25,760.2	40.8	26,041.1	40.1	26,319.8	39.3	26,611.7	38.5
Urban	35,695.8	58.3	37,320.1	59.2	38,972.1	37.9	40,732.1	60.7	42,511.9	61.5

Source: Indicators Table D-1. p. 4.

The following table shows the economically active population in the countries of the Subregion.

TABLE 13: Economically active population of the subregion 1968-1972 (in thousands and %).

	THOUSAND OF INHABITANTS					PERCENTAGE c/				
	1968	1969	1970	1971	1972	1968	1969	1970	1971	19
Bolivia	1,576.0	1,614.0	1,655.0	1,695,0	1,735.0	33.67	33.60	33.56	33.48	33.6
Colombia	6,128.0	6,194.2	6,225.4	6,819.3	6,994.5	30.10	30.26	29.47	31.29	31.0
Chile	3,065.4	3,151.8	3,242.5	3,326.9	3,436.6	32.97	33.16	33.37	33.69	34.0
Ecuador	1,818.7	1,878.8	1,940.9	2,007.1	2,080.0	31.48	31.45	31.42	31.43	31.5
Perú	4,003.6	4,136.2	4,268.7	4,416.9	4,567.8	33.30	33.25	33.39	33.49	33.4
Venezuela	2,762.7	2,842.8	2,925.3	3,010.2	3,097.4	28.24	28.12	28.01	28.03	27.7
Total Andean Group	20.368.8	20.332.9	21.319.0	22.373.2	23.040.2	33.25	32.30	32.79	33.37	33.3

Source: Indicators, table B-5 p.8

Note: c/ Economically active population:total population

c/ CELADE figures have been used since it appears that the definition of "economically active population" in Bolivia is taken to include everyone between the ages of 15 and 64. In other countries, however, the definition only covers the actually employed population.

The employment rate level, which is very low in all the countries, shows a situation of overall concealed unemployment which obviously results in a low demand for labour (and in consequence a low "effective supply"). It is significant that the employment rate is virtually independent of the per capita income level, which is slightly higher in Chile than in Bolvia and Ecuador. Naturally the exceptionally low rate in Venezuela has been influenced by the processes connected with tertiary urbanisation linked to the oil economy, but even here as it is a country which has built up a considerable import substitution industry, it is linked with the composition of investments and choice of technologies.

The trend towards investments which increase output per employed person (improperly defined as "productivity") rather than towards investments which increase employment (even though accompanied by unchanged output, or even decreasing output) has been recognised in studies like the one carried out by the World Bank and ILO as being a major obstacle to the rational utilisation of resources. However, contrary to what is often believed, this trend is not so much a question of explicit comparisons of private interests and profits as of impressions, false reasoning and to some extent superstitions such as when preference is given to the very latest technology whatever its true value or relative factor costs. This means that when working out investment rationalisation there must first be an explicit formulation of alternative investments.

I.4. Employment and output per person employed in different fields.

If one compares employment and output in the various fields of economic activity, there are significant indices of a permanent and even cumulative trend towards margination. The very structure of employment shows signs of a structural deformation which, without touching the extreme limits of "full unemployment", found in other more or less underdeveloped regions, indicate a less than optimal allocation of resources and consequently suggest that it would be advisable to optimise (or, taking into account certain restrictions, sub-optimise) resources, which is a clear opportunity to accelerate development.

The following table given the employment figures according to the fields of employment.

TABLE 14: Employment figures according to different fields of labour in the Subregion in 1970
_ (in thousands and percentages)

	Bolivia	%	Colombia	%	Chile	%	Ecuador	%	Perú	%	Venezuela	% *	Total	%
griculture	378.0	45.4 / 26.5	2,630.1	44.4	612.2	21.6	1,085.4	55.9	1,923.5	45.1	773.0	25.1	8,275.2	41.5
ines & quarries	59.0	2.8 / 3.9	75.2	1.3	52.4	1.8	4.4	0.2	90.2	2.1	40.0	1.3	317.1	1.6
anufacturing Ind.	227.0	8.4 / 14.6	901.0	15.2	651.0	22.9	260.1	13.4	614.7	14.4	432.0	15.6	3,032.1	15.4
uilding	57.0	2.4 / 3.6	276.8	4.6	211.3	7.4	81.0	4.1	183.8	4.3	226.0	7.3	1,024.9	5.2
tilities	54.0	3.0 / 3.5	291.1	4.9	255.3	9.0	70.8	3.6	174.4	4.1	269.0	8.7	1,118.7	5.6
rade	~~278.0~~ 278.0	6.4	-	-	379.6	13.4	135.4	6.9	414.8	9.7	521.0	16.8	1,575.8	7.9
ervices		11.5	1,753.4	29.6	672.2	23.7	260.3	13.4	728.9	17.1	763.0	25.3	4,420.8	22.1
iscellaneous ields	-	-		-	2.1	0.1	43,5	2.3	183.4	3.2	-	-	184.0	1.0
ubregional otal	1,553.0	100.0	5,967.	100.0	2,836.1	100.0	1,940.9	100.0	4,268.7	100.0	3,093.0	100.0	20,008.6	100.

Source: Indicators Table D-6 p.9.

Remarks: * figures of 1972
(-) Not classified

As these figures show, there is a redundant tertiary sector in the Subregion, which is an index of margination. In fact, if we take the tertiary sector as a whole (excluding utilities), namely trade, services and miscellaneous activities, we see that these account for 31% of the active population of the Subregion as a whole. Since this is a very low active population figure, it would appear likely that high employment in the tertiary sector would include a considerable degree of disguised unemployment. There are significant differences in this regard between the various countries of the Subregion, as the following table shows:

TABLE 15: Tertiary employment in the Subregion in 1970 (per thousand employed, and as a percentage of the active population).

Country	Tertiary employment..... (in thousands)	percentage of active pop.
Bolivia	278.0	17.9
Colombia	1,758.4	29.6
Chile	1,053.9	37.2
Ecuador	439.2	22.6
Peru	1,327.1	30.0
Venezuela	1,304.0	42.1
Subregion	6,180.6	31.0

Source: preceding table.

One might approximately estimate the concealed unemployment rates in a rather arbitrary fashion as follows:

a). 20% of the active agricultural population,
b). 40% of the tertiary sector, exluding utilities,
c). The difference between the active population and the population that would normally be active can be assumed, as a first approximation, to be a "normal" 35% rate ("inactivity")

In this case, concealed unemployment in the Subregion would be as follows:

TABLE 16: Approximate estimate of concealed unemployment in the Subregio in 1970 (per thousand and as a percentage of the active population).

Country	Concealed unemployment in agriculture	Concealed unemployment in the tertiary	Inactivity		
Country	Concealed unempl.nt (agriculture)	Concealed unempl.nt (tertiary)	Inactivity	Concealed unempl.nt	
Bolivia	176	111	60	307	19.7%
Colombia	526	300	1.162	1.988	33.3%
Chile	122	420	153	695	24.5%
Ecuador	217	176	149	542	27.9%
Peru	385	532	211	1.128	26.4%
Venesuela	154	520	445	1.119	36.1%
SUBREGION	1.480	2.059	2.180	5.779	28.9%

Source: Taken from foregoing tables.

Product composition shows that in the Subregion as a whole, and practically in every one of the countries, there is a vast difference in the product per person employed, which seems to show that there are significant possibilities of accelerating the development process through rational re-allotment of investment.

The following table shows the Subregional "Gross Internal Product", according to the various fields:

TABLE 17

SUBREGION: "GROSS INTERNAL PRODUCT" PER FIELD OF ECONOMIC ACTIVITY AT FACTOR COST

SECTORS	(Millions of US at 1968 par exchange rates)					Percentage structure				
	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972
1. Agriculture, forestry, game, fishing	5,575.9	5,732.1	6,067.5	6,189.2	6,313.7	16.8	16.6	16.7	16.0	15.5
2. Mines and quarries	3,749.2	3,882.5	3,902.5	3,795.9	3,635.8	11.3	11.2	10.6	9.8	8.9
3. Manufacturing industries	6,168.2	6,424.0	6,913.6	7,554.7	8,072.9	18.6	18.6	18.9	19.5	19.8
4. Building	1,593.9	1,699.4	1,764.0	2,007.8	2,216.5	4.8	4.9	4.8	5.2	5.4
5. Electricity, water, gas, sanitation	491.5	529.0	571.2	631.7	690.9	1.5	1.5	1.6	1.6	1.7
6. Transport, warehousing, communications	2,398.2	2,189.1	2,432.1	2,581.7	2,781.0	7.2	6.3	6.6	6.7	6.8
7. Trade and Finance	6,205.7	5,636.0	6,005.2	6,402.2	6,917.3	18.7	16.3	16.4	16.5	16.9
8. Landlords	1,195.8	1,246.9	1,302.8	1,358.5	1,418.0	3.6	3.6	3.6	3.5	3.5
9. Civil Service and Defence	2,606.7	2,727.2	2,819.5	2,994.3	3,222.7	7.8	7.9	7.7	7.7	7.9
10. Other services (municipal, social, personal,)	3,238.5	4,355.4	4,884.9	5,222.5	5,548.3	9.8	12.2	13.3	13.3	13.6
Total Gross Internal Product	33,245.8	34,621.7	36,663.4	38,738.8	40,837.8	100.0	100.0	100.0	100.0	100.0

Sources: Indisators, Table AE p.17.

"GROSS INTERNAL PRODUCT" = TOTAL GDP of all the countries taken as a whole.

If one compares the composition of the product with the composition of labour one sees great differences between the product per employed person.

Naturally these differences in themselves do not reveal an irrational factor allotment, but in reality they can be viewed as a significant indication of non-optimal allotment, since it is well known that sectors in which there is high product per employed person have high capital intensity (ratio capital:product) and tend to channel new investments into sectors and industries which are already highly capitalised, which require a relatively very high increase in investment in order to obtain relatively limited product increase per person employed - increased overall output that is often insignificant

taking into account the restraint on, or reduction in the workforce.

It is clear that the most rational way of increasing the development rate of insufficiently developed countries is 1/ to give up investing in sectors and in industries with different technologies within each sector. Indeed, it is far easier to increase capital output (ie. reduce the capital:output ratio), than to increase capital formation to the same degree.

In this regard, the conclusions drawn by the President of the World Bank, based on a wide and vast experience, are very interesting.

"...There exists the question of choice of technologies. It is frequently said that rapid economic growth demands the adoption of a technology which, by its very nature, has a negative effect on employment and perpetuates poverty. It is argued that unless the modern sector gets this technology, its inefficiency will limit the country's capacity to export and will perpetuate the costly reliance on imports to assure even the most basic necessities.

With regard to this matter, the study COM/XIII/dt.2 of May 16, 1974 makes some interesting points. We refer to "Fundamentos para una politica Subregional de Desarrollo Tecnològico -(Chapter II, para.2.B. - 'Importaciòn de Tecnol_ ogia), which was submitted by the JUNTA, and makes the following points :

"The use of imported know-how has multiple repercussions. First, imported technology frequently does not match the availability of production factors and internal resources. As a result, increases in production x brought about by unsuitable technology, products or processes (Note 1), often contradict the basic aims of development, such as employment levels. In the same manner, the export of commodities manufactured with imported technologies - a critical activity for the promotion of greater linking and participation of our national economies with the rest of the world - is often seriously restricted by the terms according to which these technologies are marketed (Note 2)".

Note 1: Various studies, including those carried out by ILO, demonstrate that technological progress imported from the developed countries, automation, the type of newly introduced commodities and the required scales of production, demand production techniques which replace labour by capital or which reduce the use of both of these - but particularly labour. At the beginning of the sixties the copper mining industry needed investments of US$1m for the direct creation of less than 6 jobs, in order to become efficient and compet_ itive on the international market.

Note 2: In a detailed analysis of 247 contracts for the purchase of technology in the Andean Group, based on information on the possibilities of exporting corresponding commidities, it was found that companies constituted with national capital had 90% of their contracts containing export-restriction clauses".

On the same subject, it seems relevant to mention the results of the industrialization policy that has been in progress for a long time in Southern Italy - a region which has always suffered from widespread underemployment and unemployment compared with the rest of the country, which was aggravated even more with the arrival of the post-agricultural period.

Government policy in Southern Italy has always given rise to widespread criticism, not always justified, since the policy behind this industrialization will ensure a partial return in the long term. But this does not meet the urgent needs of a part of the population who are struggling with problems that crop up day by day. Criticism is particularly levelled at the large plants for advanced technological production which, although indispensable for the national economy, are not immediately suitable to satisfy the needs of the people.

One can see from the data below, which refers to new industrial undertakings between 1969 and 1972 in Southern Italy, that there is reasonable cause for criticizing these avant-garde plants:

- number of new companies		760
- total investment	US$	3,525,000,000
- new jobs		101,575
- pro capite investment	US$	34,700

The breakdown of the capital employed:

	Investments	New jobs
- engineering and metal industries	43.7%	61.0%
- chemical industries	40.6%	14.8%
- oil-derived product industries	3.2%	0.4%
- others	12.5%	23.8%
Totals	100.0%	100.0%

From this first breakdown, one can already see some points which to a certain extent support the critics: in fact, the chemical industries, and particularly those manufacturing oil-derived products, do not seem to be able to solve employment problems; nevertheless, they are industries that have to exist in any country that wishes to be considered industrialized.

Out of the 760 companies mentioned, some 500 have been thoroughly examined from the financial point of view, and hence a more accurate breakdown of the situation is able to be made.

This breakdown is given in Table 18 below, from which several comments can be drawn; they may not be novel, but they have an indicative value and can be used for comparison purposes. First of all, there seems to be adequate justification for positing an "index of technological content" of the invest_

-ments in each industrial sector from the ratio:

$$\frac{(B)}{(A)} = \frac{\text{Investment in plant and machinery}}{\text{Overall investments}}$$

This correlation is not really rigid (for example, in the printing and publishing sector, very advanced technology is being used or could be used, but the index of 0.359 in no way demonstrates this); on the other hand it is clear that the gap which exists, which is indispensable, between the first and the last sectors, is due to pure production and organizational technological factors.

Another index which leads to more or less evident conclusions is the following:

$$\frac{(A)k}{(A)1} = \frac{\text{Overall pro capite investment in 'k' sector}}{\text{Overall pro capite investment in '1' sector (footwear)}}$$

= (relative) capital intensity index.

The following also needs no comment:

$$\frac{(C)}{(A)} = \frac{\text{Annual pro capite turnover}}{\text{Overall pro capite investment}}$$

On the basis of these three indices, we can construct the following diagrams (Table 19) which shed a great deal of light on the objectives to be followed in the choice of an industrial development model which is most suited to the economies of countries undergoing industrial formation. The conclusions risk impinging on the field of political decisions, but there is no doubt that the problems involved in the 'take-off' phase of a society cannot be solved by opting for a prevalence of advanced technological industries - in other words, by aiming for high capital intensity.

Table 18:

DATA ON NEW UNDERTAKINGS IN UNDERDEVELOPED AREAS OF SOUTHERN ITALY BETWEEN 1969-1972.

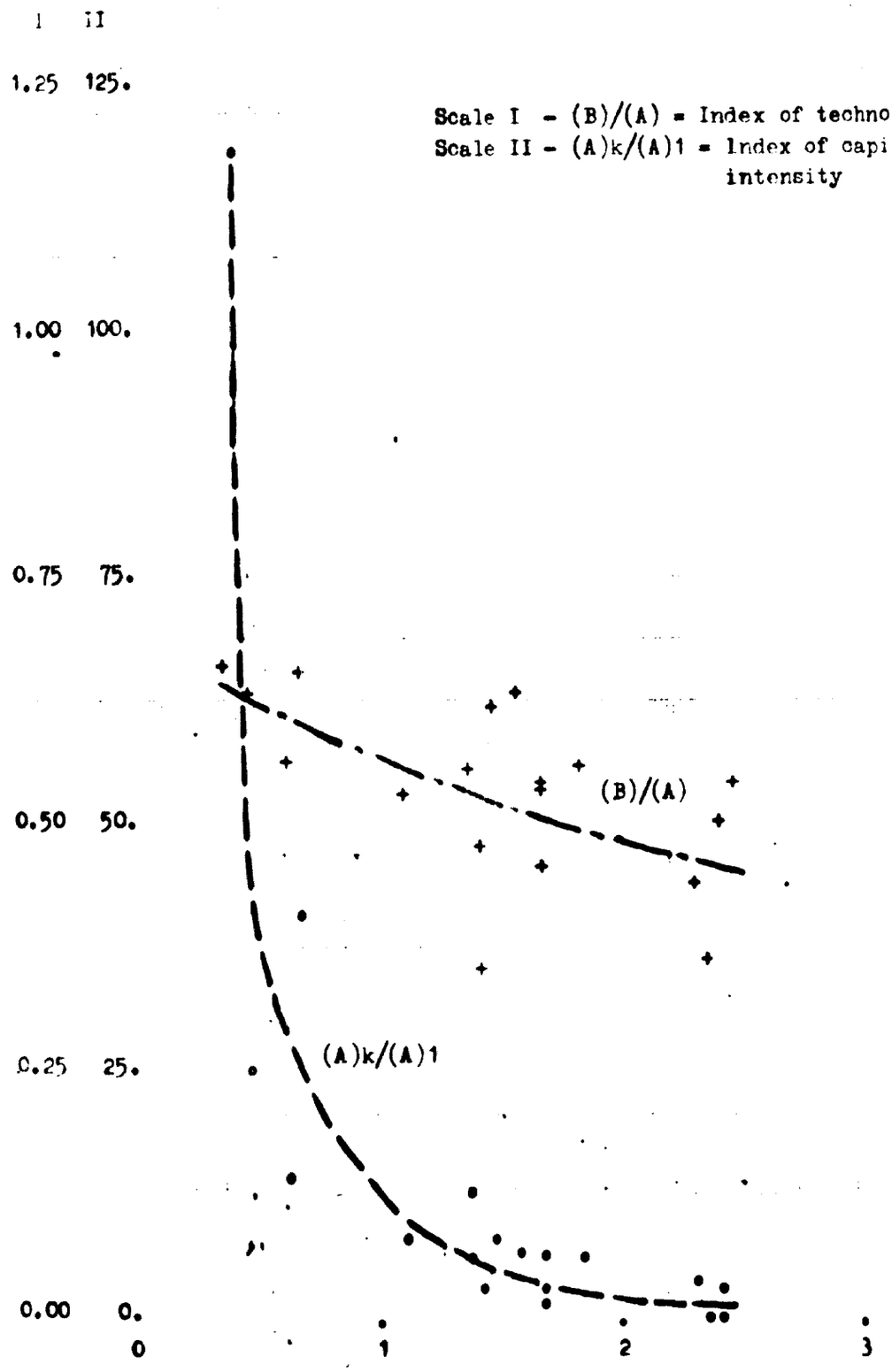
No. of new firms	501	Normal turnover (average year)	US $ 2,312,000,000
Total investments	US $2,280m	Pro capite investments	US $ 32,960
New jobs	69,189	Turnover: overall investment	(per capita) 1,01

Industral sector	(A) Overall pro-capite investments	of which (B)= plant and machinery investment	(C)Pro-capite turnover	Capital intensity (A)k:(A)l	Technological content (B): (A)	Return on investment (C): (A)
1. Footwear	2.680	952	6.340	1.00	0.357	2.36
2. Clothing and furnishing	3.950	2.030	9.480	1.47	0.512	2.40
3. Printing and publishing	9.470	3.410	13.510	3.53	0.359	1.43
4. Miscellaneous manuf.	9.550	5.030	16.130	3.56	0.529	1.69
5. Foodstuffs and allied commodities	12.200	5.470	28.340	4.55	0.448	2.32
6. Wooden furniture and furnishings	14.580	6.770	24.590	5.44	0.465	1.69
7. Leather and hides	15.060	8.250	36.840	5.62	0.549	2.45
8. Paper and allied technologies	16.650	8.090	22.280	6.21	0.485	1.39
9. Plastic goods	16.940	9.320	30.850	6.32	0.552	1.82
10. Timber	17.650	9.590	19.860	6.58	0.543	1.12
11. Rubber	18.280	9.520	30.080	6.82	0.534	1.69
12. Textiles	19.680	12.500	31.880	7.34	0.637	1.59
13. Engineering	20.280	12.500	29.150	7.56	0.617	1.44
14. Metallurgy	34.460	18.880	46.510	12.85	0.549	1.35
15. Non-metallic ore processing	39.630	22.550	24.260	14.78	0.568	0.61
16. Cellulose and chemical fibres	67.050	42.670	32.702	25.02	0.636	0.49
17. Chemicals and allied	107.700	69.740	74.920	40.18	0.649	0.69
18. Oil and coal derived products	316.950	208.500	125.400	118.30	0.657	0.39

Source: Data supplied by IASM Rome (Institute for Southern Italian Development)
Documenti sul Mezzogiorno - Anno VIII n.1 1975

NB: The US $ exchange rate is taken at 625lire.

TABLE 19 - Elaboration of the data of Table 18



~~17 bis~~

~~TABLE 19 ——— (via traduttore)~~

~~(da pagina 15)~~...

From this data one can work out those industrial sectors that hold out the most promise as being in a position to offer a fair balance between technological content, jobs, capital intensity and profitability; one of these is the sector of the engineering industries which include the electronics and telecommunicatioms industries, in Italy at least. More details on the financial position of this sector following the pattern used above are given in the Third part of the report.

Appendix: Aspects of foreign trade in the Subregion

The following tables show the volume and composition of the Subregion's foreign trade, with brief comments.

TABLE 20

Subregion: TOTAL EXPORTS OF GOODS AND SERVICES (in millions of US $)

Country	1968	1969	1970	1971	1972
1.- Bolivia	169.6	189.7	210.7	197.5	221.6
2.- Colombia	741.7	822.1	988.9	986.3	1119.2
3.- Chile	979.7	1,273.7	1,209.1	1,082.0	930.2
4.- Ecuador	225.0	216.1	258.0	269.7	353.9
5.- Perú	987.2	1,065.3	1,240.6 d/	1,086.0 c/	1,176.1 c/
6.- Venezuela	2,549.0	2,947.9	3,033.1	3,634.6	4,138.2
TOTAL Subregion	5,952.2	6,514.8	6,975.4	7,223.1	7,948.2

Source: Indicators: Table CE-1 p.87

c/ estimate

d/ preliminary figure.

TABLE 21

Subregion: TOTAL IMPORTS OF GOODS AND SERVICES (in millions of US $)

Country	1968	1969	1970	1971	1972
1.- Bolivia	206.1	218.1	212.4	229.3	267.6
2.- Colombia	814.9	890.9	1,078.9	1,190.7	1,214.8
3.- Chile	922.5	1,094.0	1,242.9	1,289.5	1,521.4
4.- Ecuador	268.8	271.3	352.9	445.4	459.5
5.- Perú	910.9	907.0	985.5	1,051.1	1,163.5
6.- Venezuela	2,137.3	2,210.9	2,347.6	2,676.1	3,039.3
TOTAL Subregion	5,260.5	5,592.2	6,219.3	6,882.1	7,645.9

Source: Indicators: Table CE-2 p.88

TABLE 22 SUBREGION: IMPORTS OF CONSUMER, INTERMEDIATE AND CAPITAL GOODS

	1968	1969	1970	1971	1972
1. BOLIVIA					
1.1. CONSUMER GOODS	31.2	32.5	31.7	33.4	37.3
1.2. INTERMEDIATE GOODS	48.9	43.2	47.5	50.2	54.0
1.3. CAPITAL GOODS	71.9	32.7	70.5	93.1	91.1
2. COLUMBIA					
2.1. CONSUMER GOODS	51.0	62.5	32.7	93.9	176.9
2.2. INTERMEDIATE GOODS	233.5	315.0	303.4	299.9	340.3
2.3. CAPITAL GOODS	262.1	291.3	371.4	379.9	322.4
3. CHILE					
3.1. CONSUMER GOODS	130.6	133.3	144.4	358.0	441.0
3.2. INTERMEDIATE GOODS	433.5	543.3	504.0	479.1	530.0
3.3. CAPITAL GOODS	237.3	244.2	247.6	244.9	292.0
4. ECUADOR					
4.1. CONSUMER GOODS	37.5	34.2	44.2	60.4	64.6
4.2. INTERMEDIATE GOODS	127.3	124.4	158.5	217.2	216.7
4.3. CAPITAL GOODS	75.1	79.0	58.4	131.9	133.0
5. PERU					
5.1. CONSUMER GOODS	97.1	90.4	85.2	97.2	103.2
5.2. INTERMEDIATE GOODS	320.2	307.5	308.7	423.6	446.3
5.3. CAPITAL GOODS	203.8	204.3	224.2	226.8	236.2
6. VENEZUELA					
6.1. CONSUMER GOODS	301.5	301.4	405.9	406.0	528.2
6.2. INTERMEDIATE GOODS	555.8	589.6	652.7	755.7	852.9
6.3. CAPITAL GOODS	793.7	815.0	826.4	1038.3	1243.9
7. TOTAL ANDEAN GROUPS					
7.1. CONSUMER GOODS	739.2	740.5	807.1	1050.9	1263.2
7.2. INTERMEDIATE GOODS	1792.5	1925.5	2111.0	2225.9	2507.1
7.3. CAPITAL GOODS	1572.9	1720.3	1952.5	2183.0	2785.2

SOURCES: INDICATORS TABLE CE-7 p. 93

CIF IMPORT PRICES

THE SUM TOTAL OF CONSUMER' INTERMEDIATE AND CAPITAL GOODS DOES NOT COINCIDE WITH THE FIGURE FOR THE TOTAL GOODS' BECAUSE IT DOES NOT INCLUDE "MISCELLANEOUS GOODS" AND ADJUSTMENTS WHICH ARE NORMALLY MADE FOR BALANCE OF PAYMENTS PURPOSES.

TABLE 23 SUBREGION: IMPORTS OF CONSUMER, INTERMEDIATE AND CAPITAL GOODS AS PERCENTAGES OF TOTAL CIF GOODS IMPORTS

	1968	1969	1970	1971	1972
1. BOLIVIA					
1.1. CONSUMER GOODS	20.4	19.7	20.0	19.9	20.1
1.2. INTERMEDIATE GOODS	32.0	29.8	30.0	29.9	29.8
1.3. CAPITAL GOODS	47.1	50.1	49.5	48.5	49.1
	99.5	99.6	99.5	98.3	99.0
2. COLUMBIA					
2.1. CONSUMER GOODS	7.6	9.8	10.6	9.5	12.1
2.2. INTERMEDIATE GOODS	44.6	44.3	42.4	48.1	46.5
2.3. CAPITAL GOODS	42.2	41.0	42.7	38.5	33.0
	94.4	95.1	95.7	88.1	91.6
3. CHILE					
3.1. CONSUMER GOODS	16.3	15.0	15.1	32.1	33.3
3.2. INTERMEDIATE GOODS	54.1	53.7	59.0	44.3	44.6
3.3. CAPITAL GOODS	29.6	26.3	25.9	22.6	22.1
	100.0	100.0	100.0	100.0	100.0
4. ECUADOR					
4.1. CONSUMER GOODS	15.6	14.3	14.5	14.7	16.3
4.2. INTERMEDIATE GOODS	53.1	52.9	52.6	53.0	51.4
4.3. CAPITAL GOODS	31.2	33.4	32.9	32.2	33.8
	99.9	99.7	99.8	99.9	99.7
5. PERU					
5.1. CONSUMER GOODS	12.5	12.3	11.3	11.5	11.7
5.2. INTERMEDIATE GOODS	43.2	41.7	35.4	50.3	47.9
5.3. CAPITAL GOODS	27.5	27.7	29.6	26.9	25.4
	83.6	81.7	76.3	88.7	85.0
6. VENEZUELA					
6.1. CONSUMER GOODS	22.4	21.4	20.7	18.5	20.1
6.2. INTERMEDIATE GOODS	31.0	32.9	33.0	34.3	33.0
6.3. CAPITAL GOODS	45.7	45.7	45.4	47.1	46.0
	100.0	100.0	100.0	100.0	100.0
7. TOTALS (AVERAGE)					
7.1. CONSUMER GOODS	16.9	16.3	16.1	18.5	19.7
7.2. INTERMEDIATE GOODS	41.1	42.2	42.0	45.9	39.2
7.3. CAPITAL GOODS	38.3	37.7	33.0	37.9	38.8
	96.3	96.2	96.1	98.4	84.7

SOURCE: INDICATORS TABLE CE-3 p. 94

THE SUM TOTAL OF CONSUMER, INTERMEDIATE AND CAPITAL GOODS IMPORTED DOES NOT COME TO 100, EXCEPT FOR CHILE & VENEZUELA, BECAUSE IT DOES NOT INCLUDE IMPORTS OF MISCELLANEOUS PRODUCTS AND ADJUSTMENTS FOR BALANCE OF PAYMENT.

TABLE 24 SUBREGION: EXPORTS OF MOST IMPORTANT COMMODITIES

COMMODITIES	1968	1969	1970	1971	1972
1. PETROLEUM & DERIVATIVES	2569.0	2549.1	2584.8	3725.2	3675.1
2. MINED PRODUCTS	1438.0	1782.3	1780.9	1470.6	1442.4
2.1. COPPER	859.1	1200.2	1134.8	877.5	854.1
2.2. TIN	80.7	80.5	85.6	91.2	93.8
2.3. ZINC	38.1	46.7	60.8	61.2	64.0
2.4. SILVER	70.3	67.2	71.1	60.2	69.0
2.5. IRON	241.4	269.3	219.1	202.3	247.9
2.6. LEAD	33.3	40.5	42.0	31.8	36.7
2.7. TUNGSTEN	8.5	9.6	14.8	11.7	9.2
2.8. ALUMINIUM	5.2	8.4	26.1	7.8	6.9
2.9. BISMUTH	–	–	–	5.0	2.5
2.10. SALTPETRE & IODINE	22.3	25.8	–	–	24.5
2.11. OTHER MINED PRODUCTS	21.1	25.1	114.5	125.6	8.9
3. LAND AND SEA PRODUCE	810.9	758.3	982.0	913.5	1013.6
3.1. COFFEE	426.1	415.9	578.8	486.8	537.4
3.2. BANANAS	125.4	125.8	142.0	145.3	147.3
3.3. SUGAR	81.6	65.0	84.4	101.5	133.7
3.4. COCOA	47.2	31.9	29.2	32.1	29.7
3.5. COTTON	85.7	89.8	86.5	77.9	97.4
3.6. TIMBER	4.8	6.5	8.0	6.5	8.2
3.7. WOOL	9.4	8.5	8.3	2.3	6.1
3.8. BEEF CATTLE	3.0	9.2	25.7	30.5	42.5
3.9. OTHER LAND AND SEA PRODUCE	23.7	24.9	30.2	27.6	18.2
4. SEA PRODUCE	235.0	221.2	340.6	328.4	267.8
4.1. FISHMEAL	233.5	219.6	345.7	327.6	265.9
4.2. OTHER SEA PRODUCE	1.5	1.6	1.9	1.8	1.1
5. INDUSTRIAL PRODUCTS	109.1	126.9	124.4	171.7	153.3
5.1. TEXTILES & CLOTHING	11.1	14.5	20.5	35.7	44.5
5.2. LEATHER, HIDE & MANUFACTURES	6.9	8.4	8.7	9.9	26.8
5.3. OTHER INDUSTRIAL PRODUCTS	91.1	104.0	95.2	136.1	82.4
6. MISCELLANEOUS PRODUCTS & ADJUSTMENT	251.7	293.1	308.0	311.5	459.2
FOB EXPORTS OF MOST IMPORTANT COMMODITIES OF ANDEAN GROUP COUNTRIES	5343.7	5780.9	6116.8	6422.9	7007.1

SOURCE: INDICATORS - TABLE CE–17, p. 168

CHAPTER VIII

QUANTITATIVE ELEMENTS & DEVELOPMENT MECHANISMS

III VIII.1 Levels of development and development processes: the Andean Subregion between underdevelopment and industrialisation

As was mentioned earlier, one may say, insofar as a degree of approximation is possible when dealing with a comparison between different economies, that the "real" level of development (in other words, bearing in mind the effect of different price-levels) in the Subregion taken as a whole is not far-off the regional average. This makes it higher than the levels obtaining in an important part of Latin America, namely the Central American isthmus, part of the Antilles, the Guyanas and Paraguay.

The fact is that with the proviso just mentioned (because development levels are never exactly or "neutrally" comparable) the current "real" product per capita in the Subregion exceeds the Western European average as it was between the two world wars, and is equal to or higher than that of the semi-developed countries of Europe as they were at the beginning of the fifties.

When we talk of "real" per capita product (as opposed to monetary nominal output), we mean the flow of goods and services or, if you like, the monetary output deflated on the basis of the different price-levels. It is generally admitted that development levels (if these are identified with per capita output) and consequently consumption and investment capacity in the different countries do not correspond to the respective per capita outputs expressed in monetary terms (e;g. in dollars) because of the difference in price-levels or, in other words, because of the lack of correspondence between exchange rates and relative purchasing power.

As a first approximation, it might be stated that this fact reduces the differences between real incomes; the more developed countries with their price-levels being generally higher, are relatively much less wealthy than might appear from a purely monetary comparison. But there does not exist a strict correlation between price-levels and development levels; though it is evident that, to take one example, the United States is not ten times more wealthy than a "semi-developed" country with a per capita output of 490 dollars, it is just as evident that it is certainly wealthier.

By definition there does not exist an "absolute" criterion for comparison - in other words, one that is independent of some conventionally agreed yardstick or other, which must necessarily be somewhat arbitrary. Comparing per capita output on the basis of price-levels (which at all events presupposes a certain predetermined composition of demand) existing in a third country cannot have any real significance; this is why comparison must ever remain at the most purely indicative and dependent upon the choice of a significant group of consumer goods.

These difficulties have led some economists to accept the idea that one should abandon the criterion of per capita output, and adopt "qualitative" indices. This alternative is naturally not without grounds for objection. Firstly, the choice of indices will necessarily be arbitrary, and there do not exist any reasons for considering this as being any less arbitary than the choice of a particular group of consumer goods. Moreover, weighting the indices is necessarily arbitrary. The indices themselves may have opposing meanings; they may indicate a high standard of living, or an irrational distortion of consumption.

In this study we are going to use the criterion of per capita products, "corrected" on the basis of the different purchasing powers; nevertheless, in some cases we shall make use of "qualitative" indices as a corrective and controllligg mechanism.

At all events, it must be observed that the objections that are often raised against measuring development in terms of per capita product generally originate in the comparison between developed and very underdeveloped countries (which, are sometimes called "infradeveloped" countries - a term which stresses the qualitative nature of the difference). Evidently, comparison in monetary terms is open to greater objections if applied to countries in which there is a very vast subsistence sector, with prices that may be very high in the limited modern sector, and with a very different pattern of consumption from the one obtaining in developed countries.

These conditions are not found in the case of the Subregion, or they exist only exceptionally, and the changes that have taken place over the past two decades (urbanisation, agrarian reforms, market integration) make the economies of the countries of the Subregion and the overall economy of the Subregion comparable to those of the developed countries.

In a very useful study carried out by CEPAL as part of its work in sounding out the Latin American situation as it is, they attempted to measure per capita income in the Latin American countries in US dollars, bearing in mind local purchasing powers (CEPAL "Measuring real income in Latin America in terms of American Dollars" in the Boletin Econòmico de Americalatina, October 1967). The figures obtained are given below in the table.

TABLE 25 Per capita income in the Latin American countries expressed in dollars, at the exchange rates weighted on the basis of average relative prices in Latin America in 1960.

Country	Per capita product at the exchange rate	Per capita product in dollars. Purchasing power based on relative Latin American prices.
Argentina	561	1,045
Bolivia	102	201
Brazil	250	342
Colombia	259	396
Chile	606	809
Ecuador	216	352
Paraguay	160	296
Uruguay	477	1,012
Venezuela	1,043	871
Costa Rica	376	537
El Salvador	220	307
Guatemala	271	327
Haiti	72	105
Honduras	194	230
México	346	562
Nicaragua	220	277
Panamá	439	520
Rep. Dominicana	239	285

Source; CEPAL
.Boletin economico de América Latina, October 1967

It is obvious that by its very nature and almost by definition, any estimate of this class can never be absolutely exact, since it is obvious that the choice of any given combination of goods used to serve as the basis for calculating the price-levels, is inevitably arbitrary.

Neyertheless, one may admit that for any practical purposes, the evaluation here set forth is much more significant than one which merely considers the rates of exchange. At least as a first approximation, the figures in the second column show an evaluation of consumption and investment capacity in the Latin American countries which, even though they are not absolutely uncontroversial certainly appear more realistic than the figures in the previous column.

As the table shows, the figures given in the second column are always higher to a differing (though not insignificant) degree compared with the first column, with the sole exception of Venezuala which, on account of its economic structure had much higher price-levels than the Latin American average; however it is a matter of some doubt whether it was even higher than the United States level.

By limiting ourselves in this study to the six countries of the Subregion, we can obtain the ratio between the "nominal" and the "real" income as shown in the following table, which we might define as "underestimated ratio".

TABLE 26: The ~~relationships~~ ratio between per capita income, exchange rate and equivalence of purchasing power in the countries of the Subregion in 1960.

Country	Income at exchange rate	Per capita a) in purchasing power	Relationship b) of sub-estimate (b/a)
Bolivia	102	201	1.97
Colombia	259	396	1,52
Chile	606	809	1,32
Ecuador	216	352	1.63
Perú	207	389	1,87
Venezuela	1.043	871	0.83

As the table shows, only in the case of Venezuela is the "~~sub~~-estimated ~~relationship~~ ratio" lower than the unit - that is to say, the comparison between ... incomes in dollars at the current exchange rate does not under-estimate but it over-estimates the "real" per capita income. In the case of all the other countries, this under-estimate is very significant (between 1.3 and almost 2), which shows that even then the countries which now form part of the Subregion were at a stage of intermediate development, as "semi-developed" rather than under-developed as such, since the least developed country in the Region (Bolivia) had a "real" per capita income which was 30% higher than the Afro-Asian average (excluding the Middle East) and equal to 0.8% of the Southern European average; the most developed country, on the other hand - Venezuela - was 60% higher than the group of Southern European "semi-developed" countries.

Not having available any more recent statistics, one can say that the 1960 under-estimated ~~relationships~~ ratios are still applicable with a sufficient degree of approximation, since the changes introduced over the past few years have not ... shrunk

"real" income in Latin American countries in proportion to their "nominal" incomes, but have rather increased it in paractically every case.

At least in the case of one country, Venezuela, this improvement marks a decisive change; as a result of the process of imports substitution, Venezuela today has price-levels which, though much higher than the Subregional average, are certainly lower than the Western European average and much lower by far than in the United Statea.

On the basis of this, and in an attempt to estimate the current levels of development in the Subregional economy, we shall apply the under-estimated ~~relationship~~ ratio calculated for 1960 (except for Venezuela where we shall assume that the nominal and the real income is approximately the same).

The followigg table shows the per capita incomes for the countries of the Subregion in 1974 . in dollars at the cursent exchange rates and at parity purchasing power calculated on the basis of the ~~proportion~~ ratio indicated (with the exception o' Venezuela).

27

TABLE 35: per capita income on the Countries of the Subregion, using the exchange rates and ... purchasing powers of 1972.

Country	Pef capita income in dollars at the exchange rate	Per capita income in dollar purchasing power.
Bolivia	200	394
Colombia	800	608
Chile	800	1,056
Ecuador	360	587
Peru	520	972
Venezuela	1,240	1,240
Subregion	633	834

Source: World Bank 1974 Atlas

Evidently, even though exact comparison is not possible, the "real" income level in the Subregion already takes it out of the group of under-developed countries as such, and in order to lay down a point of reference, we may observe that the "real" per capita income levels in the individual countries of the Subregion and in the Subregion as a whole at the present time, which lie between 400 and 1200 dollars (since the weighted average for the whole Subregion exceeds 800) have only recently been reached by these countries which we today call developed - as indeed we did even then.

This comparison must be imprecise and to a certain extent arbitrary. But it is certainly useful to be able to see the countries of the Subregion in their historical perspective, since there exists the partly subconscious tendency - for various and even contradictory reasons - to underestimate the levels of development in non-European countries today when comparing them with the situation in Western Europe and the United States in the recent past.

In his well-known publication The Conditions of Economic Progress [1] the British Economist Colin Clark attempts to compare the incomes of different countries in different periods of time, using the "international unit" as his yardstick, which equals the amount of goods and services one can purchase with one US dollar in the United States, taking the average over the period 1929-1934. This particular period was chosen so as to include different cyclic phases. Although this inter-temporal comparison cannot be very exact, we shall here assume that one dollar in 1970 equals approximately 0.4 international units/

On the basis of this yardstick, the various countries of the Subregion would have between 160 and 500 "international units" today of per capita income, since the weighted average for the Subregion as a whole is around 320.

The following table gives the dates on which various countries reached comparable income levels:

1/ This title is translated from the Spanish text, and may not therefore be the exact title of the original English work. (Translator's note).

TABLE 28: Dates on which certain countries reached per capita income levels equal to those currently obtaining in the less developed countries in the Subregion and to the subregional average.

Country	Date and income around 160 IU.	Date and income around 320 IU	Date & income around 500 IU	IU per capita income in 1951
UNITED STATES		1884,93,355	1915,516	1,122
NEW ZEALAND				950
CANADA		1800,341	1938,504	834
SWEDEN	1895,166	1927,323	1945,495	652
AUSTRALIA		1919.20,342	1997.38,500	652
SWITZERLAND		1927,396	1945,517	649
DENMARK	1870,194	Entre 1870 y 1903	1933,505	618
GREAT BRITAIN		1872, 322	1926,502	597
BELGIUM	1095,219	1950,312		521
FRANCE	1880,156	1921,348	1951,509	509
NETHERLANDS		1918,316	1950,505	499
NORWAY	1891,145	1939,399	1952,483	496
IRELAND	1883,182	1942,325	1949,442	431
GERMANY	1860,152	1934,330	1939,535	410
FINLAND	1924,171	1950,340		392
AUSTRIA	1911.12,169			266
ITALY	1934,165			250

Source: Colin Clark, op.cit. The countries are listed in decreasing per capita income as in 1951. Countries which in 1951 had a per capita income falling below 250 IU have been excluded.

III 2.2. Investment percentages and rates of development

Only in relatively recent times have been people begun to recognise the fact that investment, as a percentage of the national product, in the countries that are now developed was not as high as one had frequently imagined during the phases of relatively rapid development.

Very often, whether explicitly or implicitly, one assumed that an obstacle to sufficiently high rates of development in the insufficiently developed countries of today, was the inacceptability of a drastic curbing of consumption comparable to that which what the low pay-rates made possible during the "industrial revolutions" of Western Europe and Japan, (the case of the United States is evidently different).

In reality, the countries that are developed today had very low rates of net investment (ie.net investment in proportion to the net product) which were often lower than 5% and never much above 10% during their "take-off" period, which this often coincided with income levels greatly below those currently reached by the Subregion and by other "semi-developed areas". Although the ratio net investment:net product does not necessarily coindide with the ratio gross investment:gross product which is normally somewhat lower, the difference is not likely to be very great. The following table shows net capital formation as a percentage of the net product in certain countries that are developed today, and at the levels of development reached in periods shown, expressed in terms of "international units".

TABLE 29 Net capital formation and levels of per capita income during the "take-off" periods of countries which are now developed.

Country	Period	Net investment as % of net product	Per capita income in international units with corresponding year.
Great Britain	1700-1740	5,0	
	1740-1770	5,5	
	1770-1800	6,5	
	1810-1820	7,5	
	1840-1850	9,0	
	1860-1870	10,0	235 (1870)
Germany	1850-1860	8,8	152 (1860)
	1860-1870	8,5	
	1870-1880	11,6	117 (1877)
Italy	1860-1870	2,4	
	1870-1880	6,1	
	1880-1900	5,0	132 (1901)
	1900-1910	5,0	
Denmark	1870-1880	3,7	198 (1870)
	1880-1890	2,5	
	1890-1900	5,2	481 (1903)
	1900-1910	7,1	422 (1910)
Japan	1890-1900	4,4	
	1900-1910	3,5	146 (1913)

Source: Elaboration of the data in S. Kuznets "Quantitative Aspects of the Economic Growth of Nations" in "Economics, Development and Cultural Change Nol IX N°4, July 1961, and Colin Clark, op.cit.

If, on the other hand, we examine investments as percentages of the national product in the countries of the Subregion over the past few years, we note that this percentage is higher, and often very much higher, that of the developed countries during their take-off period.

The following table gives the investment percentages of the countries in the Subregion, between 1968 and 1972.

TABLE 30

SUBREGION: GROSS DOMESTIC INVESTMENT AS A PERCENTAGE OF THE GROSS DOMESTIC PRODUCT

Country	1968	1969	1970	1971	1972
Bolivia	18.1	16.1	15.6	15.1	13.3
Colombia	21.2	20.5	21.5	22.6	20.6
Chile	16.1	16.7	17.8	12.6	--
Ecuador	15.3	17.1	22.0	24.1	20.9
Perú	13.9	13.6	12.2	12.7	11.8
Venezuela	26.9	26.2	24.2	24.6	26.6

Source: Indicators: Table AE-3 p.25

NB. The data for calculating the investment: product ratio have been taken in the national currencies and at current prices.

Since the development rates currently obtaining in the countries of the Subregion are certainly not much higher than those obtaining in the rapid development periods of the countries which are developed today, it is clear that the current investment patterns create a much lower rate of capital productivity than that which obtained during the "industrial revolutions".

In part, this situation can be explained by the fact of the different part played by machinery and equipment in fixed investment, as the following table shows:

TABLE 31

SUBREGION: INVESTMENT ON PLANT AND EQUIPMENT AS A PERCENTAGE OF GROSS FIXED CAPITAL INVESTMENT.

Country	1968	1969	1970	1971	1972
Bolivia	-	-	-	-	-
Colombia	37.7	34.7	40.2	41.3	40.2
Chile	45.3	43.9	45.9	35.2	-
Ecuador	-	-	-	-	-
Perú	56.6	53.6	50.8	48.4	55.6
Venezuela	38.5	38.9	39.7	41.2	40.7

Source: Indicators: Table AE-4 p.26

NB. The data used to calculate the percentages in this table have been taken in the national currencies of each country at current princes.

The following table shows the portion of investment in building.

TABLE 32
SUBREGION: BUILDING INVESTMENT AS A PERCENTAGE OF GROSS FIXED CAPITAL INVESTMENT.

Country	1968	1969	1970	1971	1972
Bolivia	-	-	-	-	-
Colombia	62.3	66.4	59.8	58.7	59.8
Chile	56.7	58.1	54.1	64.8	-
Ecuador	-	-	-	-	-
Perú	43.6	46.0	49.2	51.5	44.4
Venezuela	61.5	61.0	60.3	58.9	59.3

Source: Indicators: Table AE-5 p.27

Obviously these explanations are not sufficient. As we saw in the previous chapter, a large portion of "investment" is not true "capital formation" - in other words, creation of productive capacity; it is simply "technological irrationalization" - the introduction of technologies which make it possible to substitute scatce capital by abundant labour. In other words, they show an uncritical application of technologies created in the developed countries to save on labour.

CHAPTER IV INCOME DISTRIBUTION IN THE SUBREGION

1. Different criteria for measuring inequalities of distribution.

There is no absolute, fixed criterion by which to measure inequalities of income distribution; a more uniform distribution from one point of view might be considered unequal from another.

For the purposes of this study we can examine income distribution in the Subregion on the basis of the following considerations:

a) Well-being - With a certain per capita income, and presupposing a comparable degree of shared profits, there will be a higher degree of wealth since no-one will have an income which falls much below the average.

b) Efficiency - All other things being equal, there will be a better distribution of resources since there is a close connexion between profitability and remuneration.

c) Market dimension and the pattern of demand - Within certain limits a lower degree of inequality may be necessary in order to ensure a sufficiently wide market to use economies of scale.

2.- Percentage share of the income of the poorest 40%

For the majority of the objectives indicated, the percentage of income received by the poorest 40% is a sufficiently indicative index of equality, although of course it does not show the distribution within that 40% which could be of importance in countries where there are more or less wide marginal sectors.

The following table shows this percentage for some of the countries in the region; for reasons of comparison we have included countries at approximately the same level of development in Latin America and elsewhere, and a few developed countries.

Table 33 Percentage of the national product obtained by the poorest 40%, around 1970.

Country	Percentage	Per capita product
Colombia	8,6	267
Chile	13.0	490
Ecuador	10.0	187
Perú	8.6	307
Venezuela	9.7	817
Brasil	9.8	226
México	10.5	443
Costa Rica	13,8	370
Uruguay	14,3	547
India	18.6	86
	18.0	63
	6.0	380
United States	16.0	3.857
France	9.5	1.658

Source: IBRD: Population Policies and Economic development, Washington 1973 p.188-185. Even though the per capita products given here are different from the more up-to-date data used in other parts of the study, we have preferred not to alter them for reasons of comparison.

AS these figures show, and contrary to a very widespread ppinion, there is no significant correlation between development levels and indices of equality. In the region itself, the income level of the poorest 40% is higher in Ecuador (with a per capita income of 187 dollars) than in Venezuela (317 dollars per capita); in France (1.658 dollars per capita) this percentage is practically the same as in Colombia (267 dollars). The highest index of equality in the region is in Chile, where the poorest 40% obtain 13% of the product, whereas Greece, with a per capita product which is slightly higher than in Chile (630 dollars) . . . . . though lower, if we take into accounth the price levels, has an equality index which is very much higher (21%); the other countries with a very high equality index are the Korean Republic (South Korea) with 23%, Nationalist China (Taiwan) with 20.4%.

The "infradeveloped" Afro-Asian countries have relatively high equalitys indices: India 18.6%, Pakistan 17.5%, Nigeria 18%.

IV 3. Other criteria for comparison

As we have observed, a country which is more ~~egalitarian~~ uniform according to one criterion might not be according to another.

The following table shows the percentage of average domestic income obtained by the poorest 20% of the countries of the Subregion.

TABLE 34. Incomes of the poorest 20% in relation to the national average.

Country	Average percentage income of the poorest 20% of the national average
Colombia	89.5
Venezuela	15.0
Mexico	18.0
Brazil	17.5
United States	23.0
France	9.5

Source: United Nations Incomes distribution in Latin America, New York 1970 p.11.

As the table shows, in comparison with the last table, when you consider the poorest 20%, the countries fall into a different order than in the case of when you consider the poorest 40%. As far as the countries included in this table are concerned, Colombia with a greater inequality than Venezuela at 40% level, has a lower degree in inequality at 20% level. This is due to the lower wage-levels in Colombia and to the lower income levels of small-holders[1/] in Venezuela, as well as the wider marginal sector in Venezuela.

Income distribution as indicated in the above tables is clearly "nominal" distribution in monetary terms, and does not take account of the different purchasing powers of the currencies of the various income groups. This is one of the reasons why income distribution in the Subregion appears to be more more unbalanced that in, say, Western Europe.

Of course, any "real" comparison of incomes distribution - that is to say, a comparison in terms of purchasing power - is fraught with difficulties due to the necessarily rather arbitrary choice of the consumer shopping-baskets of the various groups.

However,, it is obvious that the goods consumed by the lowest income groups are relatively cheaper in the countries of the Subregion (even though this varies from country to country) than they are in Western Europe and the United States, and that the goods comsumed by the high and medium-high income groups (particularly durables) are more expensive; indeed they are sometimes very much more expensive depending on the country (the differences between the countries are tending to decrease as a result of the process of integration).

This means that the "real" inequality in terms of purchasing power is much lower, although on average it is not easy to quantify, than the "nominal" inequality. In making this comparison, we naturally refer to the present income distribution in the developed countries of Western Europe, but it must not be forgotten that many features there are the result of relatively recent changes, particularly in the social security and full employment policies that in most countries have only come about since the war. Doubtless, the countries of Western Europe, but not the United States, used to have a much greater inequality of incomes. during their period of semideveloped economies than one finds in the countries of the Subregion today.

CHAPTER V "REGIONAL" DEVELOPMENT PROBLEMS IN THE SUBREGION

V.1. Concept of "sub-national regions" and underdeveloped areas in the Subregion.

In order to look into the development situation and the alternatives in areas underdeveloped to varying degrees in the Subregion, it is necessary to introduce the concept of "sub-national region". The term "region" traditionally refers to a part of one country, but in the sphere of international organisations and, in general, with reference to development policies and international co-operation, the term has taken on a different meaning since the war, namely, "region of the world" (including more than one state and usually many states together). It is in this sense that we talk of the "regions" of Latin America, Western Europe, Africa, South-east Asia; in other words, in the sense of a "supra-national region". This is the reason that we use the term "Subregion" to refer to the group of Andean Pact countries, which of course form one part of the Latin American Region.

On the other hand, in order to look at the development possibilities and alternatives in areas lying inside the Subregion, we are introducing at this point of the report the notion of region in reference to "sub-national" areas; of course the qualifying adjective will be used whenever there is the likelihood of confusion with the Latin American Region.

With the meaning we are using here, the "sub-national region" is not necessarily an "intranational region"; in other words, it does not necessarily form part of a national State, and may include parts of several States. In this sense, we can consider the Amazonian territories of Colombia, Ecuador, Peru and Bolivia as part of one single "sub-national" region. Similarly, the seaboard of southern Peru and northern Chile, the Ecuatorian, Peruvian and Bolivian Sierra form a "sub-national" region.

By using the notion of "sub-national" region when looking at the whole problem of "regional development" does not mean that we are aiming at equalising the development levels of all the regions. Once we have identified the ratios between the regional differences of development, and national and subregional development rates (ie. of the whole Andean Group), the decisions will presuppose of necessity some weighting of the objectives. It is probable that in many cases it will not be thought convenient to reduce the regional development differences at the cost of reducing the rate of development, both national and subregional, in those countries where development is generally seen as a high priority objective.

At all events, in order to be able to offer logically consequential solutions, it is necessary to identify the consequences of decisions aimed at other objectives. For example, the reduction of national or subregional development rates, resulting from a reallocation of resources. Naturally where reallocation of resources brings about a reduction in the regional differences, it is as if it were maximising the national development rate, and no problems arise.

V[redacted].2. Under-developed areas in the Subregion

According to a relatively recent survey by Tara-Duhalde, "The development of national regions" published in an anthology collection of papers by various authors Una década de lucha por América Latina, La acciòn del Banco Interamericano de desarrollo, Fondo de Cultura econòmica, Mexico, 1970, there exist sub-national regions in the Subregion with a per capita income level falling below 50% of the national average. As in practically every country, a very important part of economic activity is concentrated in very small areas - capital cities, and other industrial cities, mining areas and sometimes (as in the most striking case of the Peruvian seaboard) intensive farming areas - most of the rest of the Subregional territory has income levels falling between 50% and 100% of the national average.

The predominantly underdeveloped areas - i.e. those with a per capita income below 50% of the national average, - are the following:

a) part of the central and northeast area of Venezuela
b) the Atalantic seaboard, most of the Pacific seaboard and part of the internal "departments" of Colombia
c) most of the Peruvian Sierra
d) certain areas in the south midlands and south of Chile.

The map provided in the work referred to above and given in Walter Störh's book Regional Development in Latin America, Experience and Prospects, Santiago di Chile, July 1969, gives no figures for the least developed countries of the Subregion, Ecuador and Bolivia, but in the case of these two countries one may assume that their highlands areas are under-developed (even by comparison with national averages) to more or less

the same extent as the areas in the Peruvian highlands.

As the list shows, the majority of border areas or those which were colonies until recently, often thought to be under-developed, do not appear in the list of under-developed regions. In fact, in this case, the expression "under-developed regions" refers rather to the development possibilities than to the income level. In this description, East Peru is classed as a region having a per capita income between 50% and 100% of the national average; Venezuelan Guyana has a per capita income in excess of the national average like the Peruvian southern seaboard, northern Chile and the extreme south of Chile. Among the sparsely populated areas of the subregion, only the Amazon State in Venezuela has a per capita income falling below the national average.

In the works referred to above, the depression coefficient referred to national averages.

It is evident that this approach does not make it possible to evaluate the degree to which the under-developed regions have a per capita income below the Subregional average. Taking into account the great differences between the per capita incomes in the countries of the Subregion, it is evident that a region which is even only relatively developed like Venezuela may have a per capita income level which is quite a lot higher than in the developed regions of Bolivia or Ecuador.

The following table shows an attempt to give an estimate of the per capita income of the "subnational" regions, in dollars and as a percentage of the subregional average. Since the source material used does not give precise figures, except in referential terms (below 50%, between 50% and 100% of the national average) we have assumed that the "infradeveloped" regions (those having a per capita income falling below 50% of the national average) have an income level around 40% of this average, and that the "semi-developed" regions (between 50% and 100% of the national average) have an income level of 80%.

TABLE 35. Per capita incomes and depression coefficients of the under-developed regions of the Subregion.

REGION	PER CAPITA INCOME IN DOLLARS	PER CAPITA INCOME (% of the Subregional average)
South, West and Northwest Venezuela	496	82.7
semideveloped areas of west Venezuela	992	165.3
Atlantic seaboard and other infradeveloped areas of Colombia	160	26.7
Semideveloped areas of Colombia	320	53.3
Infradeveloped areas of the Peruvian Sierra	208	34.7
Semideveloped areas of Peru (west and part of seaboard)	416	69.3
Infradeveloped areas of Chile	320	53.3
Semideveloped areas of Chile	693	167.0

Source: The work reffrred to above for the identification if the under-developed areas, in Una decada etc.. For per capita product, the World Bank Atlas op;cit.

3. Under-developed Regions and "developing" regions

As previously pointed out, it is only under exceptional circumstances that the "developing" regions (in the true sense of the word, and not euphemistically, as is often the case, to mean a "underdeveloped" region), have a per capita income below 50% of the national average: in other words, they are also under-developed.

It might be interesting to note that the bulk of programmes and institutions to develop the sub-national regions of the Subregion (as is the general case throughout Latin America) are not for infra-developed regions, but for regions with important development possibilities.

There follows a list of programmes and institutions in the Subregion, and their dates of inception:

Colombia

1) Corporación del Valle del Cauca (CVC) 1954.

2) Corporación regional de la Sabana y de los Valles de Ubaté y Chiquinquirá, CVM , 1961.

3) Corporación de los Valles del Magdalena y el Sinú, C M, 1960.

4) Corporación regional del Quindío, 1964

5) Corporación nacional del Chocó, 1968

6) Corporación de la Meseta de Bucaramanga, 1963

7) Puerto libre de Leticia.

Chile

1) Junta de Adelanto de Arica.

2) Corporación de Magallanes

3) Instituto CORFO Norte.

4) Instituto CORFO Chiloé

5) Instituto CORFO Aysén

6) Programa de polos de crecimiento para Concepción.

Ecuador

1) Programa de desarrollo de la cuenca hidrográfica del río Guayas.

Venezuela

1) Consejo Zuliano de Planificación, CONZUPLAN, 1964

2) Fundación para el Desarrollo de la Región Centro-Occidental 1944;

3) Corporación de los Andes, 1964.

V[redacted].4. Alternatives for regional development

In the whole of the Subregion one can see migration away from the under-developed regions. This migration is not only more rapid than previously experienced in the Subregion, but is more rapid that it was in the incipient developing period of the countries that are developed today.

Underlying a realistic concept of the overall productivity of production factors, one has to admit that the movement of part of the population away from regions which are not only under-developed but which also possess scant possibilities for development is a physiological rather than pathological trend. If they did not migrate, with the persistence of the present population growth trend (although this is decreasing hopefully), the alternatives would be either to see these areas having an ever-decreasing per capita income level (or at any rate at an unacceptably low level) , or an irrational allocation of investment in regions where overall productivity would be lower than in other alternative areas. If one takes account of the opinions, impressions and pressures which, as a whole, are influencing today's societies, the second option would in the long term appear to be more advisable than the first. Obviously, as significant examples have shown, if investments are allocated to regions which are not only under-developed or which offer no prospect of future development, without considering the costs incolved, this would not only bring about an overall drop in the productivity of resources, but would start a vicious circle of irrational investment affecting the whole national economy.

For many reasons of which some are not fully explicit, when thinking about the development of an under-developed region, proposals relating to infrastructures carry greater weight (generally speaking these are disproportionate to real development prospects), as do those relating to basic industries, which are generally highly capital-intensive. Once started, this irrationalisation process accumulates as it proceeds. Highly capital-intensive investment create demonstrably "perverse" effects and blocks rational investment (which should naturally be low capital-intensive investment) through the pressure of the demonstrative effects of disguised employment both in the agricultural and tertiary sectors, and becomes undisguised unemployment increasing the pressures for more or less irrational investment and for the creation of tertiary activities having poor productivity. This process over a certain length of time tends to convert the under-developed region into an "undevelopable" region.

It is significant that migration from the under-developed regions have not been towards the "developing" regions, but almost exclusively towards the large cities. Thus in practically all the cities of the Subregion there is now undisguised wide unemployment and, worse, disguised unemployment, and this sort of migration is a sign of irrational reallocation of resources.

Not in every case, and probably not even in the majority of cases, the rational alternative may be migration towards "new" regions. On the other hand, it is probable that in many cases migration towards intermediate towns is more rational.

PROVISIONAL FINAL REPORT

ANNEX A

THE SECOND PART

REPORT ON THE VISIT TO THE SUBREGION

made by: Dr Luigi Vianello
Dr Francisco Lira

Date: 1 - 20 December, 1974

Programme: CAF-ONUDI
Electronics Industry

Introduction

The object of the mission under discussion in this report relates to the work schedule passed by the Steering Committee of the CAF-UNIDO Convention, (Development of the Electronics Industry in the Andean Pact countries) at the meeting held on 11 November 1974.

The work schedule included the "Technical/economic analysis and the development of studies on the infrastructure connected with the electronics industry in the subregion", which was to be developed out of an initial visit to the countries of the subregion.

The trip was first planned to begin with the "Meeting of Governmental Experts on Electronics & Telecommunications" which was to be held on 18-22 November 1974, to be followed by visits to the other countries of the subregion.

The Lima Meeting of Experts was then postponed and was held on 2 - 6 December 1974, and so the visit began on 1 December.

This meant that the work schedule had to be changed, beginning with information collection in Venezuela, and cutting down the time spent visiting the other countries of the Subregion, with the resulting schedule:

November	25 - 29	The Mission worked in Caracas.
December	1	Departure from Caracas.
	2 - 6	Lima Meeting of Governmental Experts (JUNAC), while the Mission carried out its work.
	7	Trip to Santiago.
	9 - 11	Working in Santiago
	12	Trip to La Paz
	12 & 13	Working in La Paz
	14	Trip to Quito
	16 - 18	Working in Quito
	19	Trip to Bogotà
	19 & 20	Working in Bogotà
	20	Return to Caracas.

Objectives and schedule

This Mission's purpose was to become acquainted with the existing infrastructure in the telecommunications and electronics sector of the Andean Pact countries, in order to decide on the aid that they might need to implement the suggested programmes in this sector.

The method to be used for this task was originally to have been the one set out in the work schedule passed by the Mission Steering Committee. This was subsequently altered following the Lima meetings with the officials of the "Junta" of the Cartagena Agreement, both because it was impossible to obtain the antecedent documents held by the Junta and because, for many reasons, these were not given to the members of the Mission team. During the Lima Meeting of Experts it was also clear that the Sector was split into two different subsectors, each with their own problems: these were a) Electronics, b) Telecommunications.

This suggested the advisability of changing the way the Mission should work, and can be summarised as follows:

1) To get acquainted with the various Sectorial authorities of the countries.

   a)) The task of these bodies

   b) The running of the Sectorial bodies

   c) Their links and coordination at national and subregional level

   d) Problems and difficulties foreseen for their future development

   e) Aims they have already achieved and their future plans.

2) Identifying the requirements and cooperation that could be made available to them, to develop the Sector in the light of their future programming.

   For the reasons already given, the mission carried out interviews and visited the following bodies:

   1) Improvement Corporations and Trade and Integration Institutes.

   2) Telecommunications concerns.

   3) Research and Quality Control Centres.

   4) Training Centres.

   5) Industrial Associations.

   Part of the programme also included a visit to the Representatives of the United Nations Development Programme (UNDP) in the various countries.

TEXT OF THE REPORT

FOREWORD

In the text of the report which follows, are given summaries of observations gathered in the course of the visits and interviews which were held with different bodies and authorities in the subregion. The table below divides these bodies and authorities into their respective categories.

The impressions and data received are brief and may not give a true picture of the general situation as it really is.

At all events the Mission does not feel that any possible lack of precision here will be likely to alter or modify the overall picture substantially, since the information obtained has often been redundant and also because the general picture describes the social and economic structure which comes out of the Andean Group's own statistics.

COUNTRY	DEVELOPMENT CORPORATIONS. TRADE AND INTEGRATION AUTHORITIES	TELECOMMUNICATIONS CONCERNS	RESEARCH CENTRES INVOLVING STANDARDISATION AND QUALITY CONTROL	TRAINING CENTRES	INDUSTRIAL ASSOCIATIONS
VENEZUELA	I.C.E C.V.F.	C.A.N.T.V. 96	C.E.T.T.	C.E.T.T. Central University of Venezuela	C.A.F.A.D.A.E.
PERU	M.I.T. JUNAC	ENTEL A.S.E.T.A.		I.N.I.C.T.E.L.	Sociedad de Industrias
CHILE	CORFO	C.T.C.	C.E.S.M.E.C. University of Chile	C.T.C. C.E.N.E.T. University of Chile	A.S.I.E.L.
BOLIVIA	S.T.I. I.NAL.FER.	ENTEL			
ECUADOR	CENDES	I.E.TEL.	I.N.E.N. Polytechnic	Polytechnic	AL HORVATH
COLOMBIA	INCOMEX	TELECOM	I.I.T.		F.E.C.

1. Group 1, comprising the Public Works Corporations, Trade Institutions and Integration bodies.

The bodies and institutions that were visited included almost all those concerned with national planning and the majority of those involved in planning subregional integration.

It was not possible in every case to get hold of national plans for the development of the electronics field.

The common element underlying the planning of these bodies appears to be the uncertainty about the prospects for technology and the decisions involved in implementing it. The debate as to the advisability of developing subregional technology as against following a policy of total technological independence was rather significant.

The present situation in each of the countries could prove a hindrance to the sort of detached assessment that the subregion requires. In this context it is worth noting the opinion expressed by several people regarding the need of an original study to be carried out by someone not belonging to the subregion.

As far as national market surveys are concerned, there are motivated grounds for thinking that such surveys are based on statistical evidence which, for some countries, is not reliable.

The studies carried out by the Junta have been criticised by the countries' experts, because they were based on data which was unpublished.

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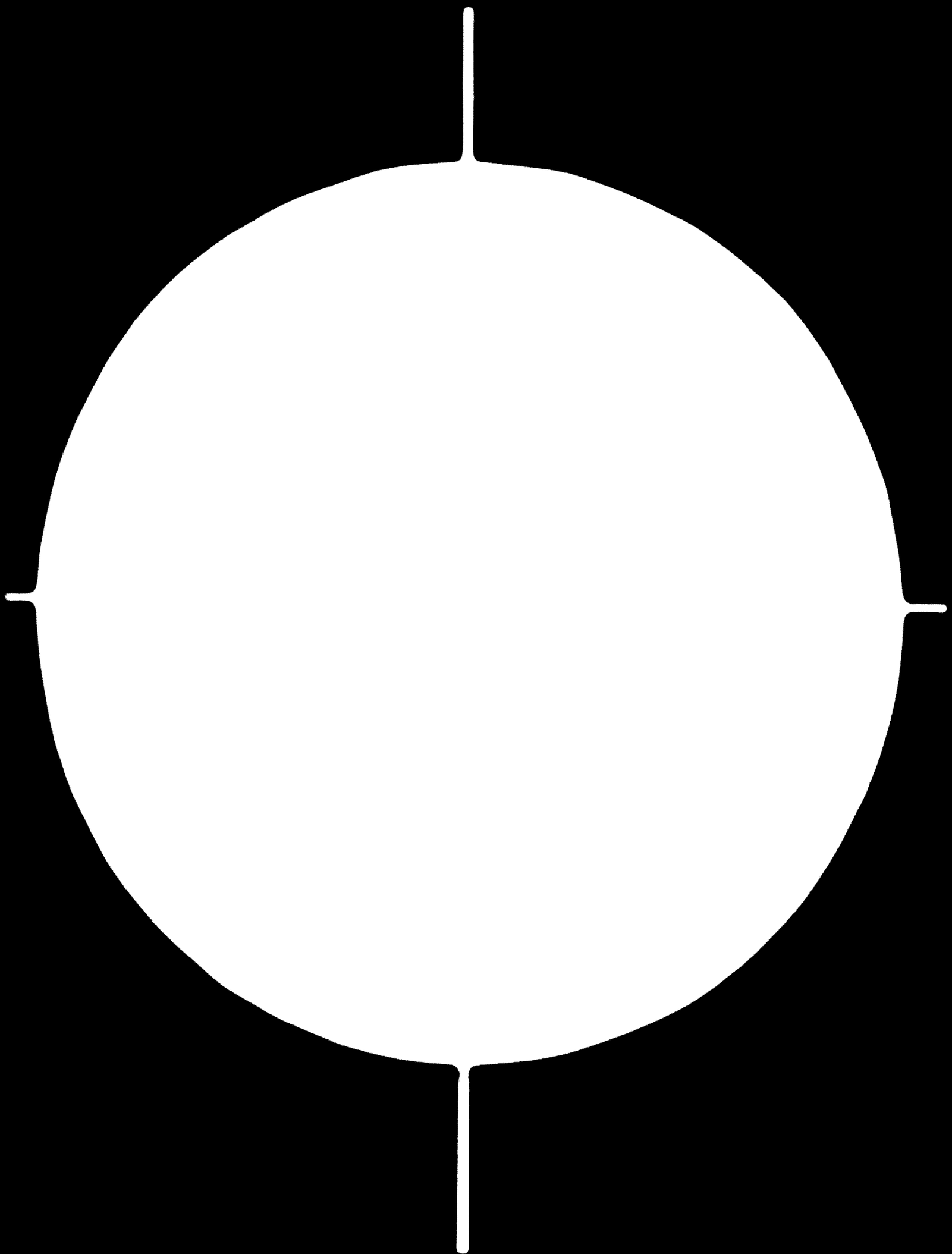

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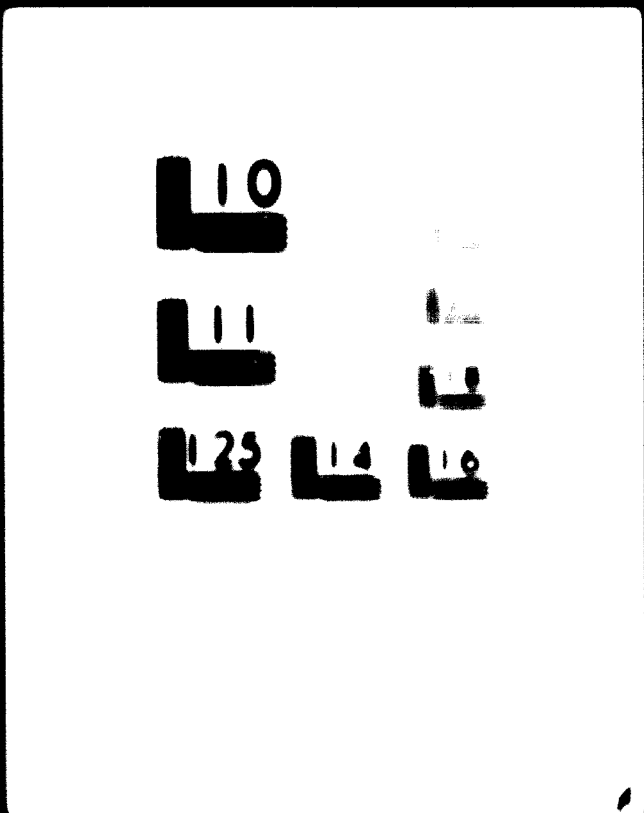

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8. Group 4, comprising the Telecommunications Companies

The telephony field is characterised by: a) a large unsatisfied demand for services, touching between 100% and 1000% of present installations b) whole areas totally without any links at all c) international links in the subregion falling below the acceptable service limits in proportion to the charges.

From the financial point of view, investment in normal extension work greatly exceeds the companies' abilities to finance themselves, and they are therefore compelled to have recourse to the home and foreign money markets.

On the other hand, the constant trend in currency devaluation on external markets, at times reaching galloping proportions, frustrate any sort of financing programme, and home inflation reduces the profit from the telephone charges laid down by the government.

As far as supplies are concerned, the telephone plant in the subregion is almost totally dependent upon third-party suppliers in the area of equipment, whereas in the area of telephone lines, installation work and infrastructure they are fairly autonomous, accounting for between 60% and 70% of all investment.

The telephone subsector, according to our information, could be an important area of labour supply in addition to being an authentic means of speeding economic and social development as in any industrialised country. Nevertheless each of the countries has higher priority sectors, and there are a great many of them; this means that there is likely to be considerable unsatisfied demand for many years to come.

The development of rural telephony is required for social reasons as well as out of sheer necessity, as some of them are to back up some of the above-mentioned priorities; the telephone companies are not at all enthusiastic about these, since they could land them in debt.

As far as international links in the Subregion are concerned, and faced with the need to achieve a satisfactory degree of service, one can foresee problems arising if direct subscriber dialling (DTD) is considered for introduction.

It is therefore indispensable for the companies to work in total coordination, if they are to achieve satisfactory operational levels.

3. <u>Group 1 comprising: Centres of Applied Research, Standardisation and Quality Control</u>.

The complete sector (Electronics and Telecommunications) does not encourage optimism. The lack of standards, even at national level, the total absence of quality control centres and the low degree of applied research (which is hardly ever aimed at industrial targets), are reckoned to be the most sensitive points for the acquisition or development of subregional technology, and one reason for feeling that it is an almost unfeasible task to try to become totally technologically independent, which in any case is still a long way off even in the so-called devloped or industrialised countries, except for one or two macroscopic exceptions.

It appears more realistic to introduce the idea of certain targets for independence taken out of the many matters which the electronics field might present; for example, trying to

[illegible] for certain products, and later concentrate on the capacity to develop certain systems.

This would prove important even from the economic point of view, as it would make it possible to concentrate a more or less large part of resources and investments.

We would recall at this point that a not insignificant part of technological development, both in the components field as well as in equipment and even more so in the systems fields, is the result of assessing and meeting the requirements of the military defence field, as experience in the industrially developed countries has shown.

This rough outline clearly admits of exceptions related to the elementary yet basic surveys into solid state components for the activity of an industrial centre applied to commercial and semi-professional electronics and the project to set up a Standards and Quality Control Board which Chile is drafting.

4. <u>Group 4 comprising: Training Centres and Vocational Courses</u>

Under this heading we include:

a) <u>The Universities</u>. Although there are certain deficiencies, the University produces enough personnel for the sector, at least quantitatively speaking. Specialisation in Electronics is of recent date (2-4 years ago) and concentrates mainly on the telecommunications sector. Recently graduated engineers attend specialisation courses in Universities and formed abroad, in part. Those doing so rarely work in industry and the majority find work in government bodies or holding, management, commercial or maintenance firms.

There is not much liaison between the universities and industry and continuous training is purely academic.

b) Technical Colleges Training in these establishments is generally done by the Universities themselves. In certain cases the training offered to engineers only reaches the level required by technicians. Both the Technical Colleges and the Universities offering this type of vocational course lack the necessary facilities. Professional ability is acquired in industry and mainly in telephone companies which have suitable equipment and facilities for this work.

c) Training and Vocational Centres. The government does operate in this area, but most work is carried on a by centres dependent upon the telecommunications firms.

Training for specialised and specific jobs is gradual and lengthy. But the results are quantitatively and qualitatively fairly satisfactory. These courses are also aimed at training technical staff and providing skills for the workmen.

In this area there is considerable and continual help offered by experts through the International Telecommunications Union (ITU).

d) Publication of Scientific manuals: A fairly indicative aspect is the almost complete lack of original scientific manuals, except those published by the different centres which of course concentrate on specific operational aspects. Practically all the texts are from the United States (in translation), Mexico, Argentina or Spain.

61. [illegible]

Generally speaking, the associations do not comprise all the firms, but they are sufficiently representative of the general feeling of the category and of its problems.

Their influence in determining an industrial policy is uniform and varies from country to country. There is lack of security and confidence in the possible instability of government-sponsored schemes.

As one would expect, these associations are more concerned with their own problems rather than with those of the Sector as a whole.

As far as Bolivia is concerned there seemed to be no industrialist associations in this sector.

It was not possible to contact the industrialists themselves, as we were asked by the Junta not to do so.

Generally speaking, firms in this sector have low capital, except foreign firms. Their main problems are financial and a question of working capital, except for the Venezuelan industrialists. Their main concern is to make maximum use of their capital without taking risks, which results in their buying technology and tending to stick to certain trade-marks and makes.

6. REQUIREMENTS FOR SPECIALISATION AND TRAINING COURSES AS SUGGESTED BY SEVERAL SECTORIAL AUTHORITIES AND BODIES.

COUNTRY	AUTHORITY/INSTITUTE ETC.	SUBJECTS
1. Venezuela	C.E.T.T.	Integrated circuits
2. Peru	ENTEL	Data transmission Minicomputers
3. Chile	C.T.C.	Telephone Exchange Design STD Networks and Operations * Minicomputers
	Chile University	Integrated circuits
4. Bolivia	ENTEL	Ground Stations
5. Ecuador	IETEL	Rural Telephony
6. Colombia	TELECOM	Data transmission TLC Electronic Systems Rural Telephony

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NOTE: This information has come almost entirely from the telephone companies. This is due to the fact that the mission had to limit istelf to getting information on requirements without including the industrial sector, since the electronics industry programme has not yet been passed.

* (Translator's note: the expression STD, as used in GB means "Subscriber Trunk Dialling" without passing through the operator. This term is used throughout this report).

Addendum to the report of the trip to the Cartagena area produced by the mission composed of Messrs. Luigi Vignello and Francesco Lira

In accordance with what was required of the mission by the Steering Committee at their meeting on 19th February 1975, there follows a summary together with observations received to date.

SUMMARY

1. The Work Programme

The Work Programme as passed by the Steering Committee at the first meeting had to be modified during the mission's work. The reason for this was that the staff of the Departamento de Industrias de la Junta del Acuerdo de Cartagena expressly requested the mission not to interview the industrialists, as this might have affected the outcome of negotiations on the programming of the sector.

In view of this, the work of the mission concentrated on the sector infrastructures.

2. The outlook for the programming of the sector

Programming in the sector has been held up by various factors which still remain, awaiting for the outcome of the meeting of telecommunications experts on March 1975 and another meeting of the Ministers of Telecommunications in May of this year. For these seasons and because of the time it would be taken to pass such a programme, it is thought that programming in this sector will be available between October and December 1975.

3. The proce[illegible] of the CAF-JUNAC [illegible]

The previous point affects the proceedings of the CAF-JUNAC [illegible] Contracts, in the sense that the second and phase to CAF will only begin when the sectorial programme has been passed

4. <u>Information available on the sector</u>

The mission was affected by the fact that the Junta had no information available on the sector.

The material provided by the Junta was found by the countries' experts to be inadequate to give any ground on which to express a judgement on the proposal.

5. <u>Infrastructure for the development of the sector</u>

a) Human resources seem to be quantitatively sufficient.

b) Assessment work is ~~at the beginning~~ [in the early stages], and still limited to very few instances.

c) Standardisation is given some attention, but at present standards are limited in number.

d) The majority of the industries in the sector are assembly industries and have therefore not developed infrastructures.

e) The Junta did not include in its suggested proposal any plan to handle infrastructure.

6. <u>Priority given to the sector</u>

It was found that none of the countries attached any significant priority to the industrial sector.

7. <u>Technology</u>

a) In the telephony field there are various technologies in the countries of the Subregion. One of the important aspects here is that in order to produce these elements in the Subregion, agreement must be reached on technologies so that they can be produced economically.

b) With regard to consumer products, there is virtually no development of home technology.

8. Financing

The telecommunications development plans will require 80 million dollars in 1980. Experts in the various countries estimate that it will be necessary to have a CAF financing programme with special allowances made for the sector.

There is no specific data available for possible financing requirements in the industrial sector.

9. Size of the firms operating in the sector

As far as the economic strength of the companies in the sector is concerned, it is at its greatest in the tele-communications firms. Generally speaking consumer apparatus industries are small.

OBSERVATIONS

In view of the foregoing, and particularly points 2) and 5), the mission thinks that:

a) it would be almost impossible to carry out matters programmed in the CAF-JUNAC-UNIDO Convention, relating to the second phase of technical assistance to CAF given by UNIDO.

b) certain first-phase tasks could not be carried out, such as:

1. Choice of the most suitable technologies for the Andean group, since no specific information has been forthcoming regarding existing industrial activity in the tasks assigned to phase 1 of the Congress, as set out under point 2.

For these reasons one could only choose the most suitable techno ogies for a developing country having similar

characteristics as the Andean group.

The mission therefore feels that certain basic elements exist for a judgement to be made so that the terms of the agreement may be given in a new direction.

ANNEX 1

The following is a summary of the 27 interviews held:

VENEZUELA

1. ICE - THE INSTITUTE OF FOREIGN TRADE

a) Department of Economic Integration

They had no greater antecedents with regard to the sector. Favour the idea of developing own technology.

b) Department for Export Promotion

Out of a total of 277 firms registered as exporters, there are 2 in the electronics sector. These are the firms benefitting from export incentives because they have a national integration rating of 30% plus.

1. CENTRAL UNIVERSITY OF VENEZUELA

Computing Centre

The number of electronics engineers trained at the University meet the present demands of the country. They have no important connexions with industrial development. The two electronics laboratories at the University are for purely academic purposes.

3. C.A.N.T.V.

Operations Department

At present there are 500,000 telephone lines. Another 500,000 lines are envisaged in the 1975-80 Plan, at a cost of US$ 1,000,000,000-, a figure which includes trunk-line installations for these lines.

The C.A.N.T.V. telephone development plans will be ready in April 1975.

They rely on C.E.T.T. for training.

4 C.E.T.E. - TRAINING CENTRE FOR TELECOMMUNICATIONS TECHNICIANS

Brief History

The Centre trains enough staff for all levels of the tele communications sector. It provides theoretical and practical training. Its development has been assisted by BID to has an embryonic laboratory to develop the apparatus required by C.A.N.T.V.

5. C.A.F.A.D.A.E. - THE VENEZUELAN CHAMBER OF MANUFACTURERS OF HOUSEHOLD APPLIANCES AND OF THE ELECTRICAL AND ELECTRONICS INDUSTRY

Association of Electronic Apparatus and Components Manufacturers

This association comprises 12 firms in this sector. By February 1971 they will draw up a list of the electronics firms in the country. At present they have a 1970 handbook

6. C.V.P. - THE VENEZUELAN PUBLIC WORKS CORPORATION

Industry Department, Electronics Section

They are preparing a Sector development Plan with the help of a Consulting firm. It will probably be ready in March 1971.

PRIVATE

1. M.I.T. - THE MINISTRY OF INDUSTRY AND TOURISM

Electrical Industry Division

a) Consumer Production

A large plant for the manufacture of consumer and professional electronic products is to be built in the industrial area of Araquipa. They are planning to produce a locally designed 3-channel TV set for US$ 120- (ex factory), at a rate of 100,000 per year in 1975 and with an approximate value of $m

At present [illegible] assembling the [illegible] of the Arequipa plant is to standardize their products and bring them a [illegible] of all the assembly firms existing in the private sector, as far as technology is concerned, providing them with the necessary kits and equipment.

As far as professional electronics is concerned, there is [illegible] a telephone [illegible] program and a [illegible] study into semi-electronic telephone exchanges, which will come into production in [illegible].

b) Quality Certification

This is currently organized by [illegible], and in future will be handled by the Arequipa complex.

c) Human resources

Aid from Canada and Japan is helping to train technicians in Arequipa and Lima.

[illegible] trains technicians and skilled workers with the aid of [illegible] funds, which it obtains from [illegible] of the companies' revenue.

In Arequipa and Lima, the Universities organize specialization courses in electronics, and train [illegible] engineers per year.

Generally speaking, the training programmes meet the local requirements.

d) Research

[illegible] is the research supervisory body, receiving [illegible] of the companies' revenue, underwriting required research work.

4. THE [illegible] ASSOCIATION ([illegible])

Electronics Industry

Assembly work alone is carried out in the plants.

Private industrialists are holding back to see what happens in the public sector. There exists a private project to set up a passive components factory.

A few simple passive components are being manufactured.

The skill-levels of technicians and workers are acceptable, but the engineers are not trained to run or set up enterprises.

1. TELECOMMUNICATIONS CORPORATION (INTEL)

Computer Centre

A pre-feasibility study into mini-computers and data transmission is being started.

Telecommunications personnel receive adequate training through INTEL which is an ITU-aided training institute.

GUYANA

1. G.D.B.P.O. - CORPORATION FOR THE ENCOURAGEMENT OF PRODUCTION

Electrical and Electronics Industry Division

At present there are 25 firms employing 7,500 people, and an ex-factory sales figure of 60-70m dollars per annum. The value of imported electronics products is 30m dollars per annum.

Present output is mainly in consumer electronics goods and calculators, in addition to few TV repeater stations.

There are two telephone apparatus plants; one is foreign owned, the other Guinean.

The assembling for consumer goods have been modified to take nationally-produced components.

The production of active components is already under way (2.5m transistors in 1978).

The government has split the administration throughout the country into about 10 regions.

2. C.T.C. - CHILEAN TELEPHONE COMPANY

Operations Management

C.T.C depends on the Telecommunications Commission which in turn depends on the government.

At the present time, Chile (C.O.R.F.O.) is buying its stake in the company from ITT, making C.T.C. fully nationally owned. The cost will be about US$ 100m.

Amongst its various activities, C.T.C. reconditions telephone equipment (30,000 per annum) and fits out private exchanges (50 to 60 per month).

The manufacture and installation of telephone lines is carried out by Standard (ITT) at a plant in Chile. In 1974 they installed 25,000 lines, having a capacity of 45,000. In the next two years they expect to reach 70,000 lines per year.

The bottle-neck in increasing the capacity of line installation is testing technicians. At present some Chilean technicians are working in firms outside Chile, which is why they are so dependent upon getting the necessary staff required to extend the installations.

As far as future investment costs are concerned, the following sums are required according to the official Programmes:

1975	1,000m E°
1976	18,000m E°
1977	18,000m E°
1978	18,000m E°
1979	700m E°

(The present exchange rate is approx. 800 E°=1US$).

35% of the investment required will go into apparatus and equipment, which could be financed by credit or by CAF).

Training

C.T.C. has its own training centre with 20 instructors who offer 80 different courses for a total of 300,000 man-hours per year. They are attended by 45% technicians, 35% traffic operators and 20% administrative staff. The engineers are trained at C.E.N.E.T. In this way 60% of the staff trained is carried out at C.T.C., 15% at C.E.N.E.T. and 25% by other bodies.

Research
~~Surveys~~

They supervise the theses in the Universities.

3. C.E.N.E.T. - NATIONAL ELECTRONICS AND TELECOMMUNICATIONS CENTRE.

~~Deputy Director's~~ Department

The centre was set up in 1969 with the aid of U.N.D.P. ~~Publishe~~ and I.T.U. ~~U.~~. together with the French government aid totalling around US$2.3m.

At present it is staffed by 60 people, of whom 7 are experts, 30 are counter-parts and the rest are supporting staff.

Its services include:

Training, product consulting and development.

It comprises the following sections:

telephone switching
telephony
external plant
radio links
micro-wave radio
telegraphy and telex
data transmission and MIC (PCM)
Industrial electronics

It trains 1,000 people a year, of which 40% are engineers, and 60% technical staff belonging to the following bodies: C.T.C.(50%), E.N.T.E.L.(40%), Posts and Telegraph (10%)

They advise industry in the field of electronic plant including I.N.S.A. (tyre factory) and E.N.D.E.S.A (the electricity company).

Among the products they have developed are:

a) a telephone repeater which is at present being redesigned to improve its performance

b) a machine to produce printed circuits

c) teaching aids.

They have expressed their interest in the joint development of products for the area with other similar centres in the Subregion, with the aid of C.A.F.

4. UNIVERSITY OF CHILE

Electricity Department

This departments works in the field of microelectronics, discrete elements and telecommunications.

They are testing out technologies to produce solid state active elements with a view to mass production for which they will need suitable experimental staff. They have digital system and automatic control laboratories. In the field of telecommunications they have carried out studies in the following areas:

traffic, diffusion, antennas and transmission.

5. ASSOCIATION OF ELECTRONICS MANUFACTURERS (A.S.I.E.L)

Chairman's Office

The industrialists do not have any long-term plans.

They might ask for CAF credit to develop a photcopier of which a ptototype already exists made with their own technology.

6. STUDY, MEASURES AND QUALITY RATING CENTRE (C.E.S.M.E.C.)

Head Office

This centre handles the development of a control centre for the electronics industry (C.E.T.E.C.), probably to be built in the Arica area. In principle, its work would concern:

- finished product and intermediate component quality certification
- instrument calibration and repair
- control and consultancy on the mechanical engineering fields related to the electronics sector.

They are carrying out a survey amongst the industrialists to work out the best way of determining the future activities of the centre to be set up at Arica.

The project, in principle, might be financed by means of a PUNUD-UNIDO scheme.

BOLIVIA

1. E.N.T.E.L. - TELECOMMUNICATIONS CORPORATION

General Head Office of Telecommunications

This concern handles everything that is connected with long distance trunk traffic. The telephone companies are independent and have their association - the Bolivian Association of Telephone Companies.

(I.D.B)

They are carrying through a microwave trunk network scheme, with 11 stations. The project is being financed by IDB and the British government.

There is a chance that the project may be enlarged and CAF would then participate.

There is a plan to link Arica - La Paz, and talks have been going on with IDB to finance it.

The mission pointed out that a project of this kind could be financed by CAF.

They are studying the possibility of A Santa Cruz-Corumbà (Brasil) link, over 600 Kms. with 240 channels.

They said that it would be useful if ASETA with CAF help could coordinate the centres for Personnel Training existing in the Subregion, and if these centres could take on the task of standardisation.

The most interesting project is the Ground Station will be come up for public tender on February 28th 1975. The cost of the station is approx. US$ 6m. There will be eight companies taking part in the tender. They will be looking at the CAF rulings on requesting credit, and agreed to send their antecedents very shortly.

In the course of conversations we were asked if CAF could guarantee an 8% interest rate, and if the credit could be approved before the tender took place; the mission could not give any answer to these points and passed them on to the Head of the local office to take further himself.

2. TECHNICAL SECRETARIAT FOR INTEGRATION

This body was set up in early 1974, dependent upon the Foreign Ministry, to deal with matters concerned with the Cartagena Pact.

a) Training

The Universidad Mayor de San Andrés has been running specialisation courses in electronics in the Engineering Faculty for 3 years. Graduates from this course find it hard to find employment in Bolivia.

The Pedro Domingo Murillo Centre trains middle-level technicians

The F.O.M.O. - Centre for Worker Training, teaches skills to workers in various fields.

ENTEL trains its own staff and the personnel of the telephone companies at its own Centre, which receives [illegible] help.

b) Research

In the electronics field there is the Cosmic Physics Laboratory, depndent upon the University, which has been recently made into an electronics laboratory used solely for the maintenance of electronic equipment, particularly in State-owned or semi-State-owned corporations.

There are 10 engineers and 7 technical staff, with support staff. To keep up to date they are planning taking training courses abroad.

c) Industries

Until quite recently, Philips built receivers in La Paz. Since September 1974, a plant has been building TV sets in Cochabamba with Brazilian capital and technology.

In Santa Cruz another assembly plant is to be built, again with Brazilian capital.

d) Quality control

There is a "Standards and Technology Office" dependent on the Ministry of Industries. Up to the present they have only dealt with the textile and foodstuffs sectors.

They mentioned concern over the following:

- the need for training to be able to identify the most suitable options for Bolivia in the electronics sector.
- CAF might be able to help in an exchange of technical staff, to enable them to learn about the manufacture of electronic products.
- it might be possible to set up a single centre in the Subregion to carry out research in electronics technology, using as a basis what had already been developed in the course of the Copper Hydrometallurgy project.

3. I.N.A.L.P.R.E. - NATIONAL PRE-INVESTMENT INSTITUTE

Executive Head Office

This body channels investment in the country with the aid of other bodies such as INI and INDEF.

It has a part in the 5-year development plan for the country which includes agriculture and industry. At present the government is giving first priority to the agricultural sector.

Studies are being carried out into existing raw materials and natural resources, mainly agricultural and hydraulic.

Among the industrial private projects, more than 300 are being assessed by the various State concerns. Despite this, we were told that there is a scarcity of intrepreneurial capacity in the country to carry through these projects.

ECUADOR

1. C.E.N.D.E.S. - INDUSTRIAL DEVELOPMENT CENTRE OF ECUADOR

Promotional Division

There are 6 concerns employing 232 direct staff. In 1973 the output figure was 5,220 items. In the same year the import figure stood at 17,800 items and it is reckoned that the black-market accounted for 15% of this figure.

The project for non-heating resistences, assigned to it by Decision 28, is now ready and waiting to find the suitable technology.

There is also a project for suppressed side band radio sets.

Radio broadcasting sets have nearly all been built in the country.

As to quality control, a picture-tube firm is producing a good quality control panel for its products.

2. NATIONAL POLYTECHNIC

Vice-Chancellor's Office and the Faculty of Electrical Engineering

In April 1975 the first course was set up, one of the purposes of which is to confer a Master's degree in the fields of electronics and telecommunications.

In Ecuador all graduates from this Faculty find jobs at once, and are in constant demand.

3. I.N.E.N. STANDARDS INSTITUTE OF ECUADOR

Head Office

The work of the Institute comprises:

drawing up technical standards

applying technical standards

quality control

quality certification

weights and measures

There are already certain standards for insulators, enamels, resins and other insulators.

They carry out quality control on insulators and switches;

They have plans for 1975 to lay down standards for parts, pieces and accessories in telecommunications.

The National Metrology Laboratory will be extended in 1975 to include basic electrics.

They are attempting to harmonise all computing equipment throughout the country.

They have the task of identifying the country's raw materials, for which they may ask a CAF credit.

4. I.E.T.E.L. - TELECOMMUNICATIONS INSTITUTE OF ECUADOR

Technical Head Office

They have found that they must split programming in telecommunications from electronica, since the tele_ communications firms work in different ways and serve the public otherwise than the electronics firms.

Firms manufacturing telecommunications apparatus must be appointed to these firms.

CAF may help in manufacturing programmes.

They find quality control to be very important, and it should be tighter in the area of Subregional production.

Quality control work should be carried out alongside equipment testing assessment.

CAF must have a programme for the marketing of equipment which should reach 80m US$ in the Subregion by 1980.

CAF should have a special financing plan for telecommunications, which is faced by ever-growing needs and requirements.

Other CAF aid could include:

- study of the firms individually and collectively to see how they meet programmed requirements.
- study of projects specifically for the Subregion. The Subregion has its own type of problems such as rural telephony.

There are problems in the technology being used. The countries are not able to develop their own technology. This will come about gradually, and the various systems currently in use will be modified.

To programme the sector, the countries must be helped by reaching agreement before the Lima meetings. CAF could give a hand here.

There is a training programme in conjunction with ITU which is just getting under way and appears to be meeting requirements.

At present there are 156,000 people registered. It is hoped that in 1977 there will be 274,000.

The problem of being unable to meet the demand in Quito has always been due to the recent expansion of the city's population.

3. ING. AL HORVATH

Industrialists are going through a difficult period at present on account of inflation.

He suggests drawing up a list of the Subregion's own developed projects.

COLOMBIA

1. INSTITUTE OF TECHNOLOGICAL RESEARCH

The prupose of the institute is to help industry in applied technology in the following fields:

- foodstuffs
- chemicals
- metallurgy and mechanical engineering
- ceramics

It is divided into three sections:

- research
- consulting (feasibility studies)
- industrial services
  a) chemical analysis
  b) quality control

So far no reserach has been carried out in the field of electronics or in planning.

The institute has 120 members of staff, of which 45 are engineers.

As far as the Electronics Sector is concerned, there is a pilot scheme to study the preparation of ceramic mixtures; they have also worked with, and will be giving technical help to the field of galvanoplastics.

They have handed on technologies developed there to other South American countries.

At the University, electronics research is being conducted, but merely at academic level.

The Institute is financed by its own revenue - 70%, plus 30% State aid.

They say that CAF could help the Institute to show them how they can help the electronics industry. The financing of this work would be done through AID.

3. ELECTRONICS FEDERATION OF COLOMBIA

Management Office

The Federations comprises 80% of all industrialists. Between 1960 and 1969 the government tried to encourage the development of the electronics industry. Later on it raised the sales tax rating from 3% to 15% and then to 25% which threw cold water on the industrialists' interest. Now they have lowered it to 6% and feel that they can revive their interest again.

On the other hand, the black market has had quite an impact. It accounts for 40% of TV sets (and almost all portable sets), 99% of radios (400,000) and 75% of record-players and tape-recorders.

In the case of certain assembled units (radio-telephones), the customs duty is higher on the parts and spares than on the whole unit.

There is a 40% duty on TV sets and in the shops they cost US$360.

Production

There are five components manufacturers, but they are in difficulties as their designs are often unsuitable to fit the different makes

Most accessories, mechanical and plastic, are manufactured in the country

Developing their own makes is made difficult by the interest shown in foreign makes and brands

In the telephone field, there was a project, but it was shelved because it did not have the required priority

Radio telephones are being assembled in the country despite the fact that components have a higher rate of duty than equipment already made up, but the factory keeps going as it only services equipment manufactured by itself
The firm has exported (contraband) to Ecuador and Venezuela

3. INCOMEX - INSTITUTE OF FOREIGN TRADE

Economic Integration Office

Industrial Programming

They find that there is a shortage of many things required to draw up a suitable programme for the sector, including:

- the Junta should define the priority of the sector and say which components are really the most suitable for manufacture in the Subregion
- the Junta should help the countries to buy technology
- an Andean Project should be set up for technological development (multinational), to develop the telecommunications and electronics sector. The Forestry Resources and Copper Hydrometallurgy Project could be used as a guide

4. NATIONAL TELECOMMUNICATIONS CORPORATION

Technical Assistant Chairman's Office

This firm is under the Ministry of Communications, but it is independently financed.

a) Training

It runs a training centre with ITU aid. They feel that ASETA could coordinate training in the subregion.

b) Production

They manufacture private table-type exchanges and towers. They are considering setting up a firm to manufacture other equipment which they need immediately.

c) Projects

They have worked out a Plan for 1976-80 with part financing from the World Bank. For financial reasons the plan has been cut down and is now worth 15m dollars.

They are now working on a plan for rural telephones to link up 1,500 communities.

For the moment a feasibility study is being carried ahead since the project is non-profit making, but has a certain social significance.

Projects which could be carried out with CAF help are:

- a recently published public tender for an internal network to reach the Ecuador border. CAF could finance the link with Ecuador. The cost of the project is around US$100,000.
- link between Maicao and Maracaibo, costing about US$400,000.
- Connection with Ecuador via Multiplex in case of a breakdown in any of the ground stations. This project will cost around US$500,000.

MULTINATIONALS

A.S.E.T.A. - ASSOCIATION OF TELECOMMUNICATIONS COMPANIES OF THE ANDES

General Secretariat

This is an organisation set up in July 1974, comprising all the Telecommunications companies in the Subregion.

The budget presented to the concerns was reduced by 30%. Venezuela and Chile are the two countries contributing to the main share of the budget.

The Association's plans include:

- general planning of the Telecommunications networks
- standardisation
- tariffs and charges
- personnel exchanges between the concerns in the Subregion
- harmonisation of staff categories.

On the other hand, as far as one could see from the Telecommunications firms of the Subregion, they are waiting to see how the Association develops, while others are expecting a great deal to come from it. We also heard the opinion voiced that the firms do not want to hand over their powers of decision to ASETA.

ANNEX II

THE FIRST MEETING OF GOVERNMENT EXPERTS ON ELECTRONICS AND TELECOMMUNICATIONS

Held in Lima, from 2-6 December, 1974.

The members of the Mission, Dr Luigi Vianello (CITACO) and Dr Francisco Lira (CAF) attended the Meeting as observers.

Before opening the meetings of experts, the Mission interviewed Dr Lucila de Kubes, Acting Head of the Industries Department of the "Junta del Acuerdo de Cartagena".

Despite the fact that the Junta is a signatory of the CAF-JUNAC-UNIDO Convention, Dr Kubes appeared surprised that CAF was going ahead with a programme to survey the Electronics and Telecommunications Industry existing in the Subregion. She explained that the Junta had already carried out a similar survey and that a second visit from CAF to the industrialists might create problems in programming the Sector.

On these promisses, the Mission explained that an important part of their work which was being finalised, was linked to the industrial infrastructure of this Sector, and so they could exclude visits to industrialists in their programme so as to avoid creating problems for the Junta.

On this basis, Dr Kubes agreed to CAF's carrying out a work into infrastructure, since the Junta had not looked into this aspect and felt that an effort in this direction could prove useful.

When asked about the development that would be provided for in the programming of the Sector, the Mission were told that the forecast proposals would probably be ready by July 1975 and would likely be jointly discussed with the motor-car and petrochemical proposal after October, which meant that the programming could be final by December 1975.

As far as previous work in the Sector was concerned, the Mission were told that the Junta did not intend to hand over very concrete information since in some of the countries, prior knowledge of this sort (particularly in the marketing field) might provoke problems during the discussion of the proposals.

Meetings of Experts

After the preliminary meetings at which the Junta produced the documents it had prepared for the occasion, it was thought necessary to divide up into working groups - one to handle Telecommunications and the other Electronics.

a) Electronics

The proceedings of the Electronics working group will be found in the sheet JUN/REG.ET/1/6, annexed to the present document.

We feel it necessary to state that the opinion of the representatives of the countries regarding the information presented by the Junta on the Subsector, was that it was insufficient.

The countries' representatives asked for the subsector to be delimited differently, requesting certain changes in the criteria for selecting the assignable items.

In the course of the experts' discussions, the need for the development of the Subregion's own technology for certain products was stressed; the representative of CAF commented, in this context, that CAF might well study the possibility of financing technological development projects

in this subsector;

b) Telecommunications

This subsector presents difficulties in programming, since existing investments in each country are considerably high. This is reflected in the following points which were brought up by those attending the meetings:

1. The possibility of setting up more than just one Telecommunications multinational concern.
2. Problems relating to the type of technology to be used in the subregion in the future.
3. Factors relating to the advisability of either changing or leaving as it is the technology currently employed, since existing equipment has not yet been written off and has another 10 to 15 years' working life left.
4. For a subregional technology and production of telecommunications equipment, there should exist a commitment to guarantee a market for it, governments.
5. The need to provide the Junta with better information about the countries' plans, and the possibility of drafting recommendations for a technology policy.
6. The subsector is estimated to require financing to the tune of 50 million dollars per year in the subsector by 1985.
7. The CAF credit channelled into this subsector should be clearly defined, since the companies' profits are low and the investments are growing constantly.

In this regard CAF credit terms were explained, and so was CAF's financing capacity.

8. Since there are problems relating to technological details in this subsector, a special experts' meeting was arranged for the second half of March. It is planned to clear up the controversial issues at that meeting and draw up certain proposals for the meeting of Telecommunications Ministers to be held in May 1975.

NOTE: Attched hereto is the document JUN/REG.ET/1/6, mentioned under a) Electronics.

THE CARTAGENA AGREEMENT

Working Paper JUN/REG.ET/1/6

Subject: Report of the Electronics Group on the Study of the Bases for the drafting of a Sectorial Development Programme for the Electronics Industry.

Source: Electronics Working Group

Date: 6 December 1974

REPORT OF THE ELECTRONICS GROUP CONCERNING THE BASES FOR THE DRAFTING OF A DEVELOPMENT PROGRAMME FOR THE ELECTRONICS INDUSTRY.

REPORT OF THE ELECTRONICS WORKING GROUP

Object: Bases for the drafting of the Sectorial Development Programme for the Electronics Industry.

Working documents used: JUN/dt 50, JUN/dt 50/add.1

Dates: Wednesday 4 and Thursday 5 December 1974.

Place: Sala de Reuniones.- First Floor.

Present at the meeting: The Working Group was composed of th following delegates, officials and experts of the Junta.

BOLIVIA	Angel Rojas
COLOMBIA	Jorge Garcia Jorge Rodriguez
CHILE	Fernando Sierpe Edgardo Zamorano
ECUADOR	Jorge Vela Fausto Ayala Claudio Revelo
PERU	Ramòn Morante Silvano Gastaldo Angel Fajardo Julio Baschuk José Maria Rosa
VENEZUELA	Rafaela de Vera Rosa de Pisani Romero Cuevas
JUNTA INTERDISCIPLINARY GROUP	Lucila de Kubes Alberto Ospina César Peñaranda Enrique Riesco Richard Foy
COORDINATORS	César Peñaranda Alberto Ospina.

AGENDA: Discussion of the above mentioned Working Papers which served as basic documents.

To integrate the subjects under review, the report has put together all the ~~concepts~~ ideas expressed regarding the features of the Electronics Industry and the Objectives of the Programme at the plenary session held on Tuesday 3 December. In this way, the Agenda was drawn up as follows:

1. Features of the Electronics Industry
2. Objectives of the Programme
3. The Scope of the Sector (Doc.JUN/dt 50/Add.1,Annex 1)
4. Sectorial limits (Doc.JUN/dt 50 Add.1,Annex III).
5. Possible assignable items (Doc.JUN/dt 50,Ch.VI)
6. Demand and forecasts for assignable items (Doc JUN/REG.ET/1/dt 3)
7. Strategy for the developmept of the Sector
8. Complementary measures.

1. FEATURES OF THE ELECTRONICS INDUSTRY

The Junta presented a summary of the major features of the Elecronics industry and its situation in the countries of the Subregion. Generally speaking, the delegates agreed with the description thus presented by the Junta, and requested that when it was later extended, it should include issues such as the proliferation of makes, technological dependence, the influence of electronics in other industrial sectors, socio-economic aspects, the tax situation, the incidence of the black market and improved quantitative information.

2. THE OBJECTIVES OF THE PROGRAMME

These were presented by the Junta and discussed by the delegations. Ecuador suggested removing the words "favour production schemes and marketing products using standardised components", in view of the fact that this was a question of strategy. At the request of Colombia, Chile and Ecuador there will be added an objective relating to the influence of electronics in areas of social importance; this objective reads as follows: "to further the socio-cultural progress of the countries in the Subregion by developing the electronics industrial sector as a catalyst to industrialisation and to progessive improvements in areas of social importance such as education, health and communications".

Venezuela requested the addition of the following objective: "Programming the Electronics Sector in the Subregion must include in its lines of action all the necessary measures to reach a degree of technological independence that will guarantee all the member nations full participation in all the actions involving product features, choice of basic technology and project engineering, so that the subregional industries can manage the different phases of industrial activity with total independence".

Chile requested the inlusion of a new objective worded as follows:

"To make it possible, through individual development, to prdduce equipment and systems aimed at meeting the socio-economic requirements of the greatest urgency". (For example, rural telephones, educational TV etc).

Ecuador stated that in the first objective mentioned in the Junta's document, one should add to the words "develop an efficient electronics industry", the words "progressively".

3. Scope of the Sector

The Junta submitted for the delegates' consideration the list entitled "Scope of the Electronics Sector and Allied Industries", in the Annex N°1, Doc.JUN/dt 50/Add.1. The delegations expressed their agreement with the content of the list and suggested that the following products be added to it:

Chile's suggestion: copper covered sheet for printed circuits

Peru's suggestion: electronic photcopiers.

4. Sectorial limits

After the presentation of the list entitled "The limits of the Electronics Sector and Allied Industries" (Annex N°4 Doc.JUN/dt 50/Add.1), the following comments were made:

Colombia requested that the following items should be excluded, since they belong to other sectors:

1.	70.11.03.00	glass tubes for electronic valves
2.	70.11.04(01)	glass tubes for TV cathode ray tubes.
	70.21.01.01	screen, cone and neck for cathode ray tubes
3.	70.11.04(99)	glass tubes for cathode ray tubes for uses other than in TV.
45.	92.13.01.00	furniture and housing for the apparatus specified by Posición 92.11.
75.	84.52.02.00	Electronic calculating machines.
76.	84.52.01.00	Electric calculating machines.
	84.52.03.00	Other calculating machines.
	84.52.04.00	Accounting machines
	84.52.05.00	Cash registers

84.52.89.00 Other totalizers.

77 84.53(01.00) Data processing centre units for electronic digital computers, including component items for these.

84.53(03.00) Computer memory bank units.

78 84.53(02.00) Peripheral units, with their coupling elements (readers, card-punchers, printers, converters etc).

79 84.53(89.00) Other machines covred by Posición 84.53 (analogue and hybrid computers).

Bolivia and Peru agreed to omit items 1,2,3 and 45; Bolivia also agreed to exclude items 75 and 76. Venezuela agreed to exclude item 45.

The Junta stated that items 19,20,21 and 23 (p.44 Annex 4) had been included by mistake in the "Sectorial limits" document, and could not be taken into consideration since they had automatically been removed by Resulution 1A. Bolivia requested that reconsideration should be given to the inclusion of item 19 "special coupling and connecting apparatus for use in electronics" on account of its special character. Both the Junta authorities and some of the delegated intervened to explain that it was no longer possible to consider this item, since it had been withdrawn from the reserve list by Resolution 1A.

Chile and Peru stressed the need to include in the Sector Programme the copper-covered parts for printed circuits and electronic photocopiers.

Regarding items for programming were concerned, Venezuela pointed out that those which already figured in common lists or which had been automatically withdrawn should not be included. The Junta explained that this was a matter on which an official stand had already been taken up. To better explain the situation, documents from the

Junta and the Venezuelan delegation were circulated.

3. POSSIBLE ASSIGNABLE ITEMS

In studying Chapter VI, dealing with "Assignable items" and the list of Possible Assignable Items therein contained, the experts stated their agreement as to the criteria for exclusion, and suggested that criteria for inclusion should also be used. They therefore suggested drawing up a list of excluded items showing the criteria used in each single instance. The list was given to them. The delegation from Peru added two more criteria for exclusion:

1. exclusion of products which were difficult to standardize.
2. exclusion of products whose manufacture and specifications were determined by special orders.

On the discussion of the list of assignable items, the delegations made the following comments:

Bolivia:

- do not include products of Position 90.20 under item 30 (p.15, Doc.JUN/dt 50).
- do not include item 90.20.00.05 under item 31 (p.16 Doc.JUN/dt 50).

Colombia:

- exclude from the list of items assignable, items 30 and 31 (p.15, Doc.JUN/dt 50).
- do not include item 90.20.00.05 under item 33.

Chile:

- include under the list of assignable items power factor corrector condenser products.
- exclude from the list of assignable items item 11 (p.14 Doc. JUN/dt [illegible]).
- identify more clearly the products under item [illegible].
- do not include items [illegible] under item [illegible].

Ecuador:

- alter item [illegible] to oscillographs alone.
- identify more clearly the products under items [illegible], [illegible] and [illegible].
- exclude the items under item [illegible], as suggested by Chile.
- consider the possibility of including "automatic switching exchange for the telex service" products under item 11 (p.14 Doc. JUN/dt [illegible]).

Peru:

- exclude from the list of the assignable items, items [illegible].
- separate direct current and alternative current motors in item [illegible] (p.[illegible]) Doc. JUN/dt [illegible]).
- identify more clearly the products under item [illegible], and examine the possibility of making item 17 into one single unit (p.14 Doc. JUN/dt [illegible]).
- restructure items [illegible] and [illegible].
- identify more clearly the products under items [illegible] and [illegible].

- requested the Junta to study Decision 57 as relating to item 26 (p.15 Doc. JUN/dt 30).

- include "electronic photocopiers" in the list of assignable items.

As far as the criteria for siting plants in the member countries was concerned (p/11, Doc. JUN/dt 30), the delegations expressed their agreement with the following suggestions:

- bear in mind existing production in allied industries, and concrete projects being implemented;

- bear in mind industrial and scientific/technological infrastructure, stressing the question of having suitable human resources;

- bear in mind the market volume offered by the different countries

6) DEMAND AND FORECASTS FOR ASSIGNABLE ITEMS

The Junta briefly introduced document JUN/REG.ET./1/dt 3 and explained the methodology used to get the figures contained in it; it also explained their information sources, the lack and unreliability of statistics, and reiterated the need for the countries to study the figures presented, hold them up against their various situations at home and send in any necessary corrections as soon as possible; the same applied to any supplementary information on 1974 regarding production and imports expressed in NABANDINA terms.

Some countries felt that the macroeconomic variable rates used were rather high. Peru introduced a documented survey of demand forecasts in consumer electronics and components showing figures which tallied quite closely with those provided by the Junta, except for certain components. Thanking the Peru delegation for their contribution, the Junta requested them to ensure that every country received a copy of their report, to which Peru consented.

Chile was concerned about some of the average prices used and requested that whenever a future revision is carried out, due notice should be taken of the effect of technological trends upon prices.

Some delegations felt that when forecasting future demand, it was relevant to consider the impact of manufacturing colour TV sets, when that happens.

All delegations agreed as to the need for better statistical information as had been noted, and undertook to send it in to the Junta as soon as possible.

7) STRATEGY

Considering the bases of the strategy to be followed as proposed by the Junta, the experts agreed and stressed the following matters:

Bolivia - stressed the importance of setting up a Sectorial Committee as the Junta had recommended.

Colombia - expressed its attitude to the strategy divided into three parts:-

a) technology - stressing the need to implement a technological development project in which the purchase and adapting of technology were considered basic.

b) Production - agreeing with the Junta that the manufacture of components is fundamental to the programme, they felt it wise to gradually incorporate Subregional components into the assembly market,

c) market - agreeing on the importance of State buying within acceptable quality and price limits, they recommended a strategy to seek industrial complementation in third countries, particularly Abramex, ~~countries~~.

Chile - stressed the relevance of State purchases, and suggested that these should be take into account quality, standards and credit terms considerations. Moreover, they noted the importance of laying down specific requirements relating to the origin of assigned items.

Ecuador - stressed standardisation and rationalisation of components as elements of strategy, and the importance of value-added exports and the search for an extended market in third-party countries.

Peru - considered it important to define the time-span of the programme. They agreed with the other countries on the importance of carrying out a Technological Development Programme and on state purchases. They pointed out that balanced interchange with Abramex might create some trouble on account of the clash between products.

Venezuela - requested that a strategy of technological independence should be considered, so as to bring the Subregion to an acceptable level of design capacity and so lessen the technological gap with more advanced countries. They also stressed the importance of envisaging a market programme which was open to third-party countries that did not have excessive protectionist policies with regard to production.

8. COMPLEMENTARY MEASURES

The Junta briefly explained the complementary measures contained in the document JUN/dt 50. The Junta also gave some ideas on a possible future "Technological Development Scheme for the Electronics Sector in the Andean Subregion" to satisfy to request of the delegations, and spoke of the AEC (Common External Tariff) in its widest sense and in regard to its place in the Programme for the Electronics Industry.

The experts expressed general approval of the complementary measures laid down by the Junta in their document JUN/dt 50.

They also agreed with the Junta on the importance of a parallel structuring of a complementary technological Programme to the carrying out of an Electronics Industrial Programme. In this regard, the Representative of the "Corporación Andina de Fomento" pointed out that this organisation could finance corresponding technological projects.

As far as AEC was concerned, Colombia expressed reservations on the list of resource allocation, stating that as part of the efficiency criteria, the tariffs should be relatively low. On this very point, Peru stressed the importance of taking into account the degree of integration that will be required of the electronics industry.

THE PERUVIAN DELEGATION

CRITERIA FOR NON-ASSIGNMENT

In addition to criteria 1-2-3-4 and 5 already given by the Junta on page 9 of the document dt/50, with which this delegation totally concurs, we suggest adding the following additional criteria:*

CRITERION 6: products which have not yet reached 'technological maturity' because they are still in a process of rapid evolution.

e.g. special semi-conductors
calculators

CRITERION 7: products which are difficult to standardise on account of the wide variety of types and models - products for which standardisation would create great adaptation problems to the makers.

e.g. coils
flybacks

CRITERION 8: products which by their very nature are unable to be manufactured and exported in the regular format, because their need to be made according to a particular design, housing, installation, or inspection requirements or adjustments "in situ" in the purchaser's country.

e.g. TV or radio transmitters
audio control consoles.

Each of these eight criteria is sufficient in itself to disqualify a product.

Only those products to which not one of the exclsuion criteria apply shall be assignable.

ANNEX III

The enquiry was based upon the following documents which are all available:

Editor	N°	Reference	Title
JUNAC	1	JUN/REG.ET/1/dt.1 19 November 1974	First Meeting of Government Experts on Electronics and Telecommunications - 2 December 1974. Lima, Peru. Provisional Agenda
	2	JUN/REG/ET/1/dt.1 5 December 1974	First Meeting etc.. Provisional list of delegates.
	3	JUN/REG/ET/1/dt.1	First Meeting etc.. Provisional list of Delegates
	4	JUN/dt 50 29 October 1974	Bases for the darfting of the Sectorial Development Plan for the Electronics Industry.
	5.	JUN/dt 50/Add.1 30 October 1974	Annexes 9 Jun/dt 50
	6.	JUN/REG.ET/dt 2 29 November 1974	First Meeting etc Sectorial Programme for the development of the Electronics Industry Telecommunications Subsector

ANNEX III

Editor	N°	Reference	Title
JUNAC	7	JUN/REG.ET/1/dt 3 29 November 1974	First Meeting etc. Draft Demand and forecast demand of Assignable items
	8	JUN/REG.ET/1.1 3 December 1974	Draft proposal of the Venezuelan Delegation to be incorporated as a further objectove in the programming of the Sector
	9.	JUN/REG.ET/1/2 3 December 1974	Draft proposal of the Chilean Delegation to be incorporated as a further objective in the programming of the Sector
	10	JUN/REG.ET.1.3 4 December 1974	Working Group 1: Electronics
	11	JUN/REG.ET/1/4 4 Decmebre 1974	Working Group 2: Telecommunications
	12	JUN/REG.ET/1/5 5 Decmeber 1974	The Peru Market
	13	JUN/REG.ET/1/6 6 December 1974	Report of the Electronics Group on the Study to draft a Sectorial Programme for the Electronics Industry

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Editor	N°	Reference	Title
JUNAC	14	6 December 1974	First Meeting etc... Draft Resolutions of the Working Group on Telecommunications (rough draft)
	15	JUN/REG.ET/dt.4 5 December 1974	First Meeting etc... List of non-assignable items
	16	J/PR/50/Rev.2	Andean Grpup: some socio-economic guidelines
VENEZUELA CETT	17	September 1974	Training and Research i the Venezuelan Telecommunications Corporation
	18	26 April 1974	III Day, Venezuelan Conference on Telecommunication 9 Conference Documents.
CHILE	27	-----	Newsheet on the Centre's activities
CIEE CORFO-SIEL	28	------	Chilean Electronics Industry
Catholic University of Chile	29	August 1974	Final report - Analaysis of the financing requirements of the Chile Telephone Corporation

ANNEX III

Editor	N°	Reference	Title
CENET	30	1973	PNUD. National Centre of Electronics and Telecommunications. Project Document of the Government of Chile.
	31	May 1973	National Programme for the Training of Telecommunications Personnel
	32	January 1973	National Centre of Electronics and Telecommunications: Final Report on 1972 activities.
C.T.C.	33	December 1972	Chile- Forecast demand for telephone lines between 1971-1990.
	34	May 1974	Historical survey - The Company's Telephone Service, Current situation.
	35	May 1974	Development Project of rural telephony in Chile.
	36	June 1974	Project for National Telecommunicatio:
	37	June 1974	Plans and projects for extending and improving the public telephone service.
	38	1974	Curricula - Training Dept.

ANNEX III

Editor	N°	Reference	Title
CORFO	39	COD-B-900 September 1970	Bases for the creation of: a) A centre of Applied Electronics Research. b) A Quality Control Centre for Electronics Products.

THIRD PART The Electronics Industry in the Andean Subregion

Chapter 1.

1.1 The pattern of the electronics sector in the subregion

1.1 Following the proposals submitted by the subregional Delegates at the 2nd Conference in Lima (See foreword para 1.1), the electronics sector destined for programming has seen a [illegible] in the product lines envisaged initially and mentioned in the introduction.

The product lines taken into account are correspondingly reduced, and result as follows :

1) Telephone equipment
2) Telecommunications equipment (telegraphy and telex)
3) Radio communications equipment
4) Complementary equipment for sound and TV broadcasting
5) Electromedical equipment
11) Commercial electronic equipment for domestic use (much reduced in comparison with the volume of products initially included in this line).

The related active and passive components are listed amongst general purpose items, without a sharper definition of their commercial or professional features.

Note: Other items excluded are nos. 1, 2, 6, 9, 14, 20, 29, 30 & 31 listed in document JUN/R84.11/I/dt.) "Demanda y Proyecciones de las unidades asignables".

1.2. In view of the differing aspects involved in the technological and marketing problems, the electronics sector has been subdivided and allotted to two different Working Parties of the XVIth, based on two main sub-sectors:

1- Electronics sub-sector

2. Telecommunications sub-sector

The reasons for this division are to be found above all in the fact that the materials and equipment for telephone, telegraphic & data switching and transmission necessitate important decisions on the most suitable choice of technologies to be adopted; this implies that they feel the effects of the present state of evolution, particularly in the switching field, which is under way in the industrialized countries, as well as the fact that their products are exclusively aimed at the large telephone service concerns which are totally controlled by the individual governments in the Subregion.

The large size of initial investments needed for the development of a telephone industry, and the fact that their commercial outlet is reduced to one single channel demands a policy and programming that differs from those implemented in the electronics sector which aims at a very varied market, offering a diversified series of products.

1.3 On the basis of Subregional demand and production forecasts data supplied by the JUNTA for the area to be programmed it is estimated that for 1985:

Subsector	Subregional Demand (in $ 1,000)	Output ($)	%
Electronics	259,070	143,330	55
Telecommunications	111,470	98,960	89
Totals	370,540	242,290	65

Taking into account the requests for additional exclusions of certain items from the area to be programmed the situation modifies as follows:

Subsector	Subregional Demand (in $ 1,000)	Output ($)	%
Electronics	143,030	89,190	62
Telecommunications	111,470	98,960	89
Totals	254,400	188,150	74

1.4 In defining the area to be programmed, the JUNTA experts applied selection criteria to the electronics sector (for exclusions), which can be summarized as follows:

Criterion 1: Current rapid obsolescence
Criterion 2: Simplicity of the technological process, or Indifference to the Economy of Scale
Criterion 3: Sensitivity to Economy of Scale
Criterion 4: Overlapping with other sectors
Criterion 5: Excessively high technological level

In Table 1.1.4 below, it can be seen that these criteria have had both a relative and overall effect on the definition of the area to be programmed. In this way, one can draw some fairly meaningful conclusions relating to the general conditions under which the industry in this sector will tend to develop, since it is clear that:

1.4.1. It is impossible to reach a suitable economy of scale (Criterion 3) above all in the whole sector which is subject to exclusions, and in each category which the sector comprises.
This also shows that the most critical element in the development of this industry is trying to find the minimum dimensions and general conditions to guarantee savings to the concerns.

1.4.2. In the components and consumer goods categories, more favourable conditions exist (or will exist) (Criterion 2) and with less difficulty (Criterion 5 non-operative) in non-programmed industrial activity.

Table I.1.4.

CATEGORY	PRODUCTION ITEMS		APPLICATION OF EXCLUSION CRITERIA 1-5									
	Sector total n.	excluded n.	1	2	3	4	5	1	2	3	4	5
			n. of events					frequency				
Components	35	12	3	5	5	2	0	20	33	33	14	0
Products:												
- Consumer	10	8	0	5	5	4	0	0	37	37	26	0
- Professional	39	25	6	3	20	4	8	15	7	48	10	20
TOTALS	84	45	9	13	30	10	8	13	18	43	15	11

1.4.3. In the category of professional products (and almost automatically of their related components) within the area to be programmed, problems to do with technological evolution (Criteria 1 & 5) may also occur in addition to the difficulties already mentioned regarding economy of scale.

The Delegations of the Subregion have tabled different requests to proceed to make further exclusions within the area to be programmed, on the basis of criteria that essentially boil down to those already given, and of others which they maintain to have been stipulated by some of the Delegations:

a) difficult standardization
b) specially-requested commodities

1.5 If these requests for exclusions that the Delegation have made should be accepted, the sector would look like this:

CATEGORY	PRODUCTION ITEMS		
	sector	excluded	programmable
Components	35	17	18
Consumer goods	10	9	1
Professional products	39	30	9
Total	84	56	28

The additional exclusions that have been requested are linked to the trends already referred to in para 1.4 of this chapter, and may be fairly summed up as follows:

- the Subregion would rather leave it to the initiative of each individual country to deal with the industrial development of consumer goods, since these best meet the general conditions for satisfactory development, while concentrating on dealing with the main difficulties due to economy of scale in the components sector (essentially destined for consumer goods).

- The Subregion feels that industrial activity in the professional products (and components) sector is not feasible, with the possible exception of goods for Telecommunications: at present the complex conditions that need to be met in order to proceed with a plan for Subregional industrialization are still under review.

I.2. Comparisons between the Andean market (1985) and the Italian Market (1975).

2.1. The study trip to Italy showed the CAF official and the Mission the various aspects of industrial activity that underlie Italy's electronics sector.

All in all, these activities are determined essentially by market factors, and after the second world war (1945) - over a period, therefore, of about 30 years - they have consolidated their structures and are well-integrated into the a vast and extremely vigorous social and economic framework of the European Economic Community which, in its turn, is able to make use of the channels of scientific, technological and commercial exchange that have been set up throughout the industrialized world.

2.2. These market factors have enabled Italian industry to maintain and raise its creative and production levels to the extent required not only to meet the demands of the home market, but also those of the export market.

As stated in para 2.3. below, the volume of exports is a vital factor in developing the sector which needs to pay its way in order to acquire the necessary technological processes and imported commodities, while in its turn offering specific technological know-how and goods which meet the levels demanded by international standards.

2.3. The electronics manufacturing industry in Italy is divided into two sectors which reflect the subdivision laid down for the Subregion, namely:-

A. Telephony and Professional Radio

B. Civil Radio and Television - Components.

The summary data for these two sectors in 1972 show:

Electronics grouping	1972 Sales (per million US$)	1972 Exports	%
A. Telephony and Professional Radio	1,080	350	32.4%
B. Civil Radio and TV - Components	370	230	62.1%
	1,450	580	40.0%

Sales for the Electronics grouping, moreover, represents:

- about 40% of the total Electrotechnical and Electronics industry turnover
- about 5% of the total Manufacturing Industry turnover sales
- about 1.3% of the total Gross Domestic Product.

2.4. In order to draw some comparison between the Subregion and Italy, whose respective population figures are around 70 and 55 millions respectively, it may be a good idea to give a few details regarding the size of the market for both components and equipmentxx. The data comes from the following sources:

2.4.1. For the Subregion - from the forecast estimates of the year 1985, when the sector will have reached comparable size and equilibrium after the required basis had been laid to ensure industrial take-off and the Subregional Gross Product has been shown to have increased. The data are taken from the document JUN/REG.ET.I.dt.3, referred to already in para.1.1 of this chapter.

2.4.2. For Italy - from the 1975 market forecast estimates worked out by the magazine "Electronics", on 26.XII.1974 and completed with the data contained in the 5-year Plan of the SIP Telephone Company for 1975 regarding the telephony sector.

2.4.3. The following table partly sets out the items listed in the JUNTA document referred to in para 2.4.1.:

Item	Description	Market demand (in millions of US$) Subregion (1985)	Italy (1975)
	Components		
2.	TV yokes, flybacks, transformers, etc.	10.05	15,5
6,7,8.	Capacitors, fixed	14.17	46.7
9.	Capacitors, variable	2.08	7.4
10.	Switches (for electronics)	4.29	4.0
11.	Potentiometers	3.71	11.3
13.	Semiconductors (small signals)	10.76	18.7
14.	Semiconductors (more than 1 w)	20.56	28.9
	Equipment		
19.	Audio tape recorders	9.30	26.7
20.	Telephone sets	14.50	61.2
21.	Telephone switching, PABX	12.20	8.9
22.	Telephone switching, public	84.67	388.5
24.	Broadcast	5.33	4.7
25.	Radiocommunications	15.78	47.4
28.	Laboratory test equipment	8.33	32.5
29.	Industrial	15.16	172.1
30.	Electronic calculators	7.20	94.8
31.	Peripheral units	43.70	181.3
32,33.	Medical and X-ray	27.02	37.0
	TOTALS (in millions of dollars)	308.81	1.187.6

2.5. One can draw many conslusions from these figures, but they might not be strictly accurate in view of the diversity in the general conditions which underlie these data, as well as because of the fact that the items selected for the comparison represent just one part of the electronics market.

One can merely see that the market figures refer to two periods, 10 years apart, and that the ratio of the forecasts for Italy and those for the Subregion stands at 4 to 1.

Presuming that the market is closely bound up with the development of the Subregional Domestic Product with an annual 7% growth rate (as forecast by the JUNTA in their macroeconomic study used to draw up the 1985 market forecast), the market would double in size every ten years; one can therefore deduce that there is very roughly a gap of 30 years between the development of the two markets as they stand today. In other words, the Subregion today is where Italy was in 1945 when it was at the beginning of the change-over from an essentially agricultural to a typically industrial economy.

2.6. This gap has been noted and confirmed by the results of the Mission's trip to the Subregion as reported in the Second Part of the report.

Nevertheless this gap has to be seen merely as an indicative measure of the state of things. In reality, the Subregion has the chance of being able to implement its sectorial programmes without necessarily having to pass through all the stages of technological development that the industrialized nations have done; it can thus select from among the most up-to-date technologies to find the most suitable. From the technological point of view, therefore, the gap is slight, provided that there are people and institutions available that are able to make correct use of the chosen technologies.

Where it seems unlikely that the evolutionary phases will accelerate, on the other hand, is precisely in the market developments themselves, since these are the result of a general process of improvement and transformation that can neither be rapid, nor taken for granted. Moreover, the Subregion has programmes for the balance and development of sectors based on priority higher than those set for the Electronics Sector.

CHAPTER II

II.1 The objectives of technological development in the Subregion

1.1. The document COM/XIII/dt.2/rev.1 of 16.V.1974 published by the JUNTA entitled "Fundamentos para una politica subregional de desarrollo tecnolòǵico", examines with detailed argument the whole complex question of technological development that is required for the economic and social 'tafe-off' of the Subregion, and gives the objectives of the Subregional Technological Policy.

1.1.1. These objectives are:

a) to reinforce the capability of selecting and utilising the technological solutions which are found to be the most suitable to speed up the subregional development process within the specific limits of the economic and social conditions of the Subregion.

b) to overcome gradually the internal and external technological limitations that condition the autonomy of the decisions that relate to the development processes of the Member States.

1.1.2. The document also states what the Priority Areas ought to be and the content of Technological Activity:

Priority Areas:

- areas of social interest
- traditional exports
- perfecting of activities which can lead to new exports.

Content of the Technological Activities:

- Management
- Assimilation
- Generation
- Ancillary activities
- Learning

1.2. The study carried out by the JUNTA Commission deals with the subjects relating to technological development throughout the various fields of application, and it does so with great realism.
Bearing in mind the directives supplied by the study, the Mission feels it wise to give certain details which characterize the Technology of the Electronics Sector, so that further consideration may be given to the way in which this technology fits in with the guidelines laid down by the JUNTA.

II.2. The Technology of the Electronics Sector

2.1. The features which distinguish the Electronics Sector, understood in its widest possible sense, can be summed up as follows (without making any claim to be exhaustive, since many things depend on legislative factors, economic, strategic and traditional factors that vary from one country to another):

2.1.1. The application of Electronics and Telecommunications will grow in importance in all the production and administrative activities, as well as in life-styles; over the next few decades even revolutionary plans will be implemented at national as well as subcontinental level, to create structures that will involve widescale use of equipment and electronic equipment

and systems.

2.1.2. Both from the creative, applicational and production point of view, Electronics is a field of intellectual, scientific and technological field of great value, - so much so, that it is one of the components that leads the whole economy as well as the transformation of society.

One should also note the very low level of environmental pollution that this kind of industry creates.

2.1.3. The size of the plants is generally small.

In Italy, 64% of firms employ less than 500 people, while the average for the whole sector is less than 1,000 employees per company;

This characteristic is even more marked in the United States, where there are around 6,000 companies working in the electronics sector; of these around 93% employ less than 1,000 people.

2.1.4. Electronics technology - at least in its unceasing development and penetration into virtually every area of modern-day living, is characterized by demanding phases of research and design, and by production phases in which the criterion of mass-production, to a highly repetitive degree, discovers very diversified solutions depending upon the category of product in question, as well as on their level of consolidation and other contingent constraints.

Innovatory activities often require technological capital investments and medium and long term research investment entailing a high degree of risk and, in a sense, high capital intensity. The more strictly industrial stage is characterised by predominant labour intensity, but even this can produce highly automated output not unlike a high-level craft industry using technology.

With reference to the financial commitments mentioned above, here are some data taken from studies on economic planning in this sector which were carried out recently in Italy, still to be published officially.

The following refers to the area of professional electronics:

Production category	Fixed Assets	Sales
	(US$ per capita.....)	
Largescale data processing	10,250	22,500
Smallscale " "	7,450	13,400
Semiconductors (*)	15,500 ⇔ 33,000	14,000 ⇔ 24,000
Passive components	9,200 ⇔ 15,400	15,400 ⇔ 20,300
Telecommunications	15,000	20,300

(*) In this category one must allow for the use of highly automated production technologies, with great sophistication; plant and machinery investment may reach US$70,000 per capita.

It is also of great interest to see the breakdown of the total capital investments required for new plants in the professional electronics category, and in telecommunications. The source of this information is confidential and may not be quoted; it refers to a 4-year investment of around US$30m, distributed as follows:

1. Land	3.2%
2. Industrial buildings	25.1%
3. General plant	23.6%
4. Specific plant and non-automatic operational machinery	5.2%
5. Chemical plant	6.0%
6. Equipment and instruments	30.2%
7. Furnishings and office equipment	4.2%
8. [illegible] equipment	[illegible]
9. Vehicles	[illegible]
Total	100.0%

The electronics of consumer goods has values which are considerably lower than these, but even in this case one must realise that product innovation might demand financial commitments comparable to those required for professional electronics. The sale [illegible] here is around U.S. 10,000 - 12,000. pro capite

3.1.5. The great variety of applications leads to making the electronics production highly diversified, with levels of sophistication that are sometimes risky. Research and applied experimentation are required from and for other sectors (chemical, metallurgical, engineering, electric, water, agriculture, banking, schools, hospitals etc).

With the sole - and only partial - exception of the United States, it may be fairly stated that no country is able to take on the necessary commitments to ensure it of total autonomy in initiative- and decision-taking. Today one simply has to accept that one must be more or less dependent upon other countries. Strategic factors in company management or national security may modify, but not totally dispense with, the degree of dependence one has upon sources of technology from abroad. At all events, mutual exchange of technologies has now become a constant fact of life amongst the industrialized countries at least, and is of vital and mutual interest to all concerned.

The technological contributions are made in forms and at stages which differ in importance: from reproduction by imitation or modification, to production under licence and co-production through inter-company agreements.

In many cases, not least because of the constant evolution which characterizes this sector, direct costs for the purchase of technological know-how do not constitute a serious hindrance. The economic success of such acquisitions comes largely from the ability to appraise and negotiate technology, and by the subsequent ability to know how to transfer and utilize it correctly.

2.1.6. The industrial processes of Electronics are brought about by the contribution of manpower which, from a quantitative point of view, is often at opposite ends of the scale of professional values.

Whereas the creative side demands the availability of manpower (including highly skilled and expert personnel), the production side makes wide use of moderately-skilled manpower, or people that can be quickly and easily trained in to operate

in non-complex production phases.

Many production phases, particularly in jobs which are repetitive or do not demand physical exertion, are entrusted to women workers, even with the same pay as men. Such workers are often taken from other production sectors, including agriculture, after a period of training. Generally the results are satisfactory.

2.1.7. We have already said that frequently training courses are necessary at all levels, - refresher courses for technicians and management, specialization, re-qualification and initial vocational training.

This is dictated by the need to keep constant pace with technological evolution, the need to modify and adapt production lines for the mass-production of new or different products, and to guarantee higher motivation amongst the workforce.

These courses are carried out in special centres, depending on the nature of each, sometimes outside the plant itself or directly on the production lines.

2.1.8. In industries that spend part of their work in research and design, it becomes vital for them to have at their disposal adequate measuring apparatus.

The measuring apparatus shop which is of a significantly higher quality and cost in professional electronics, is one of the items of expenditure that determines production profit.

The choice of measuring apparatus must be very carefully carried out, because it may be upon this choice that the design and manufacturing quality of the product may hinge, from the technical as well as other points of view. The measuring instruments need to be regularly checked and calibrated.

2.1.9. The way factories and their allied plants are built usually make it possible to completely restructure the production set-up without significant costs.
Water and electricity consumption are of secondary importance and the problems of safety at work are easily solved.

Depending on the organization of the company and the labour contracts, factories and plants have services such as sick-bays, workers' canteens, recreation rooms, group transport facilities.

2.2. While referring to the characteristic features of electronics technology, it is vital to mention one of the most important factors in any strategy for the sector. We refer to the special rôle played by the possession of all the information and data necessary to design and manufacture active components, namely discrete and, to a greater extent, integrated semiconductors.

At the same time we shall sketch an outline of the problems and difficulties that this sector poses.

2.2.1. There are relatively few semiconductor factories in the world, of which only a tiny fraction have earned a dominating position for themselves thanks to well integrated output, to having kept constant pace with technological advances and to having a wide-ranging commercial network available.

Competition is very keen, probably more than in any other field.

Over the past decade prices have dropped by up to 700%, while turnovers have increased (in 1973 the world turnover was 60% up on 1972's).

Meanwhile the market has been offering ever more complex and efficient components so that products rapidly become obsolescent, including commercial and professional items.

There are many signs that this evolutionary process is far from over, and that there are moves afoot in the manufacturing world to implement company tactics to enable certain manufacturers to dominate the market even more.

The future of this sector is based on the development and introduction of LSI (large scale integration) on ever larger scales: each one of these is able to perform the functions of one complete piece of apparatus or of substantial parts of it.

2.2.2. The world semiconductors market is worth around 6,500 million dollars for an output of just under 10,000 million units.

The manufacturers who operate on a purely competitive basis are felt to be the following: Texas Instrument, Motorola and Intel (USA); Philips (Netherlands) and SGS-ATES (Italy); the others (ITT, RCA, SIEMENS, Telefunken, Thomson-Houston, Mistral, Mullard, Ferranti etc) which are known throughout the world, manufacture these items as part of a company or group strategy aimed at guaranteeing supplies to back their own products.

In order to achieve security and success on the competitive market, a company must have a minimum annual output of 300 million units and a turnover of around 100 million dollars, backed by structural features of world standard.

2.2.3. Technological processes now in use and those being experimented require quite complex plant and equipment obtainable from specialized, independent, suppliers.

There are only a few extremely specialized machines that can be invented and built by a company itself. Moreover it is felt that totally automated production is not a good idea, since the products may have to be changed so frequently that the costly automation set-up would be unprofitable.

Particular attention should be given to important items such as air-, temperature, humidity, dust, radiation conditions in the workshops where the basic operations are performed.

2.2.4. This means that the active components industry is still using high quantities of labour for certain operations, which affects the production costs and induces such firms to transfer these production phases to other countries where labour costs are lower. The following table gives the impact of the various phases on the final cost of the product:

Description	Components integrated (% cost)	Components discrete (% cost)
1. Preparation of 'chip' 1/	40	5
2. Assembly and packing	30	50
3. Assebly materials	15	25
4. Testing	15	20
Total	100	100
Return on chip	10%	90%
Final return	98%	98%

NB/ 1/ By 'chip' we refer to the active element of the component obtained by working on the silicon by oxidation, [redacted] doping [redacted] and protective surface treatment.

2.3. Technological activity in the Electronics sector is not limited nor exhausted by examination of the purely industrial or company aspects of the question. There are other supporting structures that in fact precede, follow and run parallel to these, forming a substantial part of such activity itself.

In general terms, these non-primary components are called 'infrastructures', and can be identified as follows:

- Istitutes of metrology and standardization of component materials and product performance.
- Quality control and trademark centres. Product, installation and maintenance standards.

- School, universities and post-graduate centres. Vocational training, refresher-courses and specialization.

- Technical/scientific committees comprising government, industrial, academic representatives.

- Planning and programming bodies, at national and community levels.

- International relations through Congresses, exhibitions, lectures, publications.

- Marketing activities: agencies, branch-offices, representatives, impart-export, advertizing

2.3.1. An on-the-spot investigation carried out in the Subregion has shown a relative lack of these infrastructures: this is certainly prejudicial to the success of promoting and developing this sector. Special effort should be made to strengthen these supporting structures, and to creating them where they do not exist.

3. ELECTRONICS IN THE SUBREGION - SUMMARY OF CONSIDERATIONS

3.1. From what has been said in the previous part of this chapter, one can come to certain conclusions regarding the pattern of the results that the introduction of electronics technology would bring with it vis à vis the principles laid down by the JUNTA with regard to technology.

3.1.1. One should bear in mind that there are no prior experiences in this sector, at least at the level of community activities.
What has been done at national level (Telefonica centre in Chile, the new Arequipa complex in Peru) might offer grounds for making a judgement, but the feedback flux is so limited that it does not afford a sufficient basis

to individuate the trends.

The following opinions do not therefore take into account the experience already obtained in technological development.

3.2. A primary consideration is the fact that since Subregional Electronics technology is still in its infancy, it cannot be included in any of the Priority Areas laid down by the Junta. A partial exception may be made for the Areas of Social Interest, since the applications of Electronics Technology and, to a greater extent of Telecommunications, can find suitable applications as infrastructures for the development of other production areas (e.g. rural telephony and TV to support the agricultural sector) and can certainly help towards solving the problems of creating jobs.

3.3. As far as the content of Technological Activity is concerned, Electronics can positively meet each of the requirements of the Activities which the JUNTA has laid down as an overall balanced development of the educational level in industry, administration, teaching and society.

However there does not seem to be a great deal of technological know-how in the Subregion of sufficient depth or spread that it is able to trigger off spontaneous internal growth just by means of simple incentive systems.

This is amply confirmed by the study carried out by the Stanford Research Institute (USA) for the JUNTA and CAF under the title "Investigation of Electronic Industries to be located in Andean Group Countries". In this study, which describes the industrial profiles of product lines in which the US has wide experience and data, and which have been transferred into the Subregion, it is shown that the Subregio

needs to import technology under licence in 40% of the cases examined, and as joint-venture concerns in the remaining 60%; this highlights the fact that it is inevitable that massive foreign help will be required, particularly for those lines whose complexity demands the collaboration of the supplier of the technology; this lack of technology may have to be re-appraised subsequently since certain specific technologies have already been introduced into the Subregion since the study was carried out.

II.4 Trends in the Electronics Technology field

Throughout the world there is a certain underlying evolutionary trend which, in order to assess thoroughly, would require a specially organized investigation into the industries and major collaborators in the sector.

Nevertheless it is possible to offer a series of guidelines to be used to make a better overall assessment of the most important technological trends in the area of those categories of products which the JUNTA intends to include in its sectorial programming.

4.1. Telephone equipment

4.1.1. Telephone switching exchanges

Electronic switching systems are successfully penetrating more and more the various PTT Administrations. Out of the many systems that have been developed by various industries, around a dozen of them have achieved a level of experimentation that they can now be considered ready for large-scale development.

Various countries have proposed these systems (USA, France, Great Britain, Italy, The Netherlands, Switzerland, Australia, Japan, Sweden, Canada, Germany) and by 1977 they will come into normal service in the public networks; some of them have already been introduced and are working regularly.

Widescale expansion, however, is limited by various factors:

- the need that the PTT Administrations have of re-examining the whole network structures as they stand at present, as well as the operational procedures and the technical training of operators.

- the non-suitability of replacing traditional systems, many of which are still far from being able to be written-off, simply because the new systems happen to be brand new;

- the financial difficulties which all the PTT Administrations(together with the telephone companies) are having just now;

- the fact that the new exchanges are not yet completely "settled in", due to the fact that there are likely to be important innovations as a result of the evolution envisaged in hardware and software for computers; this applies particlarly to the central control units.

4.1.2. Subscriber telephone apparatus

Alongside the introduction of electronic exchanges, and even with the current semi-electronic ones, the telephone apparatus will also have to be basically modified from being dial-operated to keyboard

command: there are also more advanced proposals for types that will replace the present receiver sets, or that will incorporate voice-operated digit decoders.

4.1.3. The telephone network

This might also be subject to modifications. As things stand at present, the network tends towards being a carrier of partially integrated numerical transmissions only for medium distances (10 - 200kms) because of the trend to and suitability of PCM transmission systems (Puàse Code Modulation). Over larger distances preference will be given to DDM which is able to carry up to 10,800 channels and over, fed through 6-plus channel coaxial cables. However, even for long circuits, solutions are being envisaged for numerical transmissions of up to 4,000 channels. Transmission media using optical fibres and circular wave guide are still in the laboratory stage, or limited to experimental use.

4.2. TELEGRAPH AND TELEX EQUIPMENT

4.2.1. Telegraph switching station

The technological trend is like that for PABX private telephone exchanges, and is therefore moving towards integral electronic or semi-electronic solutions.

The large cable, telex and data traffic exchanges are being fitted out with automatic subscriber switching systems, or with store-and-forward or message-switching types.

This technique is also possible, financially speaking, for the telex offices in large private concerns (banks, oil companies, transport, air,

industrial companies and large stores).

4.2.2. Teleprinters

Electronic teleprinters which substantially do without the traditional mechanical systems arex already about to come onto the market, with an important number of new services and performance features.

4.3. RADIO COMMUNICATIONS APPARATUS

There are two families of apparatus: fixed use and mobile use.

4.3.1. In the first case, transmission equipment is generally of higher power and the trend is to increase reliability, ease of operation and control, and automatic operation (for the non-manned stations).

The use of solid state components is spreading, except for the higher power range, where valves or klystrons are still being used, which generate relatively high voltages and raise safety and reliability problems as a result.

4.3.2. In the second case, comprising portable and mobile equipment, the trend is towards the use of LSI circuits to cut down the weight and energy consumption since the major limiting factor to portability is still the power supply and battery units.

4.4. COMPLEMENTARY APPARATUS FOR SOUND AND TV BROADCASTING

This category includes a whole series of very varied and highly specialized devices. Aided by the almost general lack of power circuit stages and

low Megahertz frequency processing, the trend is towards improving reliability, performance and automation which are easily obtainable with solid state technology.

Totally electronic equipment for the shooting and presentation of pictures is now at the end of the experimental laboratory phase, and can now replace the TV filming tubes (vidicon etc) and the cathode tubes.

4.5. ELECTRO-MEDICAL APPARATUS

This is an area where electronic instruments have penetrated to a marked degree, offering solutions to the enormous problems in public health services, while at the same time creating great crises in the methods of medical care and the doctor/patient relationship.

The trend towards discrete automation of medical care, including laboratory analysis and research, is by now an irreversible process on account of the great advantages in terms of speed, precision and standardization. In the radiography field, using both X-rays and radio-isotopes, equipment is becoming more sophisticated through the incorporation of large numbers of electronic parts, going so far as to using more or less specialised computers as well.

The potential market is so vast (2,000 million dollars in the United States and Europe in 1975) that developments in this sector are limited merely to the inventiveness of the makers, considerable financial problems for the purchasers and the need to train hospital staff to use the new now, often sophisticated, equipment.

6. [illegible] electronic equipment for domestic use

This category is composed essentially of TV sets, radios and cassette recorders for leisure use because of the high rate of competition, they tend to make use of every possible technological innovation to catch the eye of the market or to increase productivity and profits.
The trend is toward the use of solid state circuits using medium to large scale integration circuits; a recent example of this trend was the decision taken by several makers to replace the TV tuner units with frequency tuners that can be manufactured cheaply.

Equipment of this kind tends to increase in sophistication including automatic controls, Hi-Fi and quality features, and special effects - all achieved with greater reductions in size and power consumption.

7. [illegible] components

6.7.1. In the case of [illegible] components ([redacted] capacitors, resistors, [redacted], hybrid circuits, magnetic components and piezoelectric quartz) the features of the electronic apparatus is tending to reduce prices of the traditional passive components compared with what they used to be. The new performance features and the new design techniques put into the apparatus affect the demand for new passive components, so much so that the components manufacturers have been compelled to introduce many and more new product lines.

In the area of capacitors, MOS technology is leading to ... this type of component and to selectively develop it in order to increase its capacity while reducing its size. The new tendency to miniaturization also conditions the technological evolution of tantalum and polystyrene capacitors.

The development of the technology of hybrid circuits has had repercussions on ceramic capacitors because of the production of highly reliable products which can be soldered into a hybrid circuit support and thus overcome the problems of space and circuit technologies.

The development of these apparatus also affects the field of resistors. Because of the increasing interest in modularity and miniaturization, new trends in this area will concentrate on adopting new materials and where possible maintaining metallic elements such as rare earths, silver, and palladium etc.

The same type of conditioning also applies to magnetic components, especially in the telecommunications industry; the same applies to printed circuits and piezoelectrical components for which there is a call for closer accord with the respective component industries.

4.7.3. The evolution of the demand for semiconductor active components (transistors, diodes, integrated circuits) will tend towards wider use of base materials and technologies, such as silicon, planar technology and MOS (Metal oxide silicon). This use will lead to the development of a series of subtechnologies which will differ from each other on the basis of their electrical and operational features. This area will become ever more characterized by

by a vigorous evolution and proliferation of sub-technologies, especially in the short-term. Increased importance will be attached to professional components for digital technologies.

The technological evolution of these components is more important than the importance of the component itself, and will play a leading role in the process of transforming the manufacturing techniques of electronic equipment.

Demand for LSI circuits will also grow all the time because of the progressive increase in demand for 'function' by surface units, which will cut down the unit costs per 'function'.

This technical aspect underlies the growing adoption of LSI techniques to equipment, especially for data processing, and will lead to a radical change in new manufacturing techniques (microprocessors and their features.

Additionally, the developments in the field of consumer equipment, particularly TV sets and sound amplification systems, will have a strong impact on the field of linear integrated circuits.

CHAPTER III

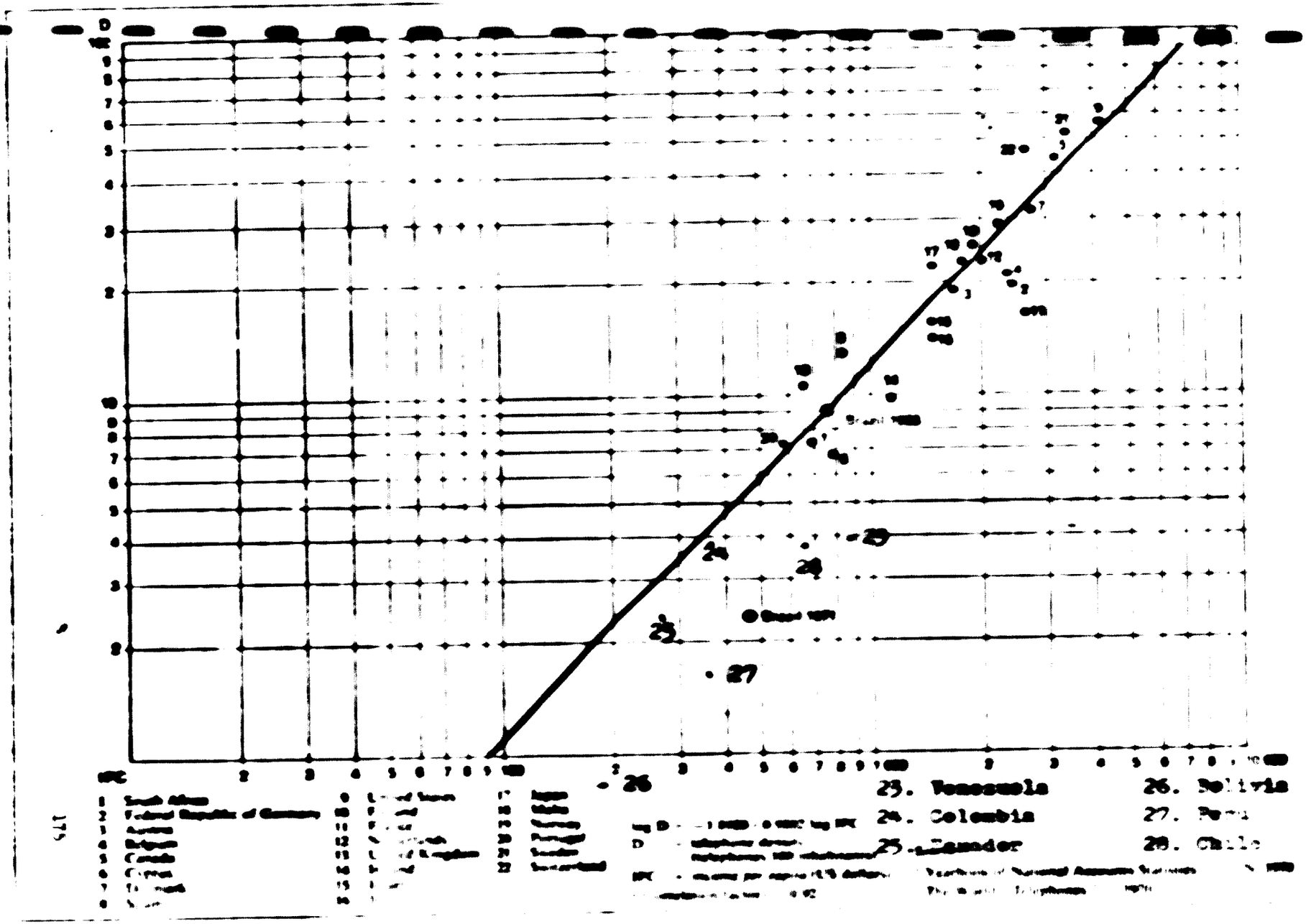
III.1 FINAL OBSERVATIONS

1.1. The sectorial programming must deal with the economies of scale more seriously, because of the insufficient size of home markets or lack of company profitability, in any case.

1.1.1. We exclude from this consideration for the moment (in the absence of more and reliable information on the subject) the Telecommunications Subsector which could fill the gap that can be seen in the following diagram. This subsector could come into its own, in industrial terms, and thus have a favourable impact on many aspects of the whole sector.

1.2. The home market for the sector is more or less in its infancy. The Andean economy is largely agricultural and mining-based, with heavily pronounced tertiary activities; industrialisation is still not widespread, while private incomes suffer from an unbalanced distribution. On the other hand, the forecast 7 per cent growth rate for the Subregional Domestic Product - if verified in the event - should leave room for beneficial economies for a rational take-off in this sector very soon.

1.3. The development of the electronics sector is to play a non-primary role in the community programmes, even though it will keep some of its promoting features as a factor for rapid social change and as a support to other production sectors.


25. Venezuela
26. Bolivia
24. Colombia
27. Peru
25. Ecuador
28. Chile

II.2. RECOMMENDATIONS

2.1. Despite the uncertainty of the sector, due to a certain lack of data and the necessary knowledge, as well as the lack of concrete forecasts for the Telecommunications subsector, the foregoing conclusions make it possible to formulate the following recommendations:

2.1.1. In order to ensure the right sort of development in the sector, it is necessary to promote institutional undertakings to create certain infrastructures at Subregional level, such as:

- A Coordinating Body or Committee empowered to issue authoritative recommendations.
- A Standardization and Control Body empowered to grant Quality Certificates.
- A Scientific and Applied Research Institution, with a documentation and promotional Centre annexed to it.
- State or private Schools to run the vocational and practical courses for the training of technicians to work in electronics and telecommunications.
- Specific Degree Courses in Electronic Physics and Engineering, run by the Universities.

We should also like to recall the conclusions and reccomendations contained in the UNIDO report drawn up as in October 1974 by Mr R. Richard Foy as the JUNTA expert, with which we are in accord in general terms.

2.1.2. Programmed activity in the sector, considering that it is of secondary priority and private profits are low, should be directed at the manufacture of instrumental rather than consumer goods.

These instrumental goods should serve the other manufacturing sectors of higher priority, and strengthen telecommunications systems within individual countries and between Member States.

2.1.3. Using foreign technologies should strike a compromise between more advanced developments and the need to create jobs and provide training. Our advice is that plants should be created to carry out the manufacture of foreign-owned processes, following a programme for the gradual, but not necessarily total, tranfer of technology.

2.1.4. We propose that many of the industrial activities will require a customs protection programme, in order to guarantee profitability in the early stages of production.

To this end, one should improve commodity checking systems at the borders of the community, and protect oneself against the undesirable introduction of materials which are subject to customs protection. Customs protection tariffs need not be excessively high; we would advise them to be kept at levels which balance out against the export-incentivization grants applied in certain Member States.

UNIDO Contract n° 72/84
Activity Group n° 1

APPENDIX 1

Project: Development of the Electronics Industry
in the Countries of the Andean Group.

Final provisional report (Phase I°)

APPENDIX I

CRITICAL SURVEY OF THE WORK CARRIED OUT BY THE STANFORD RESEARCH INSTITUTE, "INVESTIGATION OF ELECTRONIC INDUSTRIES TO BE LOCATED IN ANDEAN GROUP COUNTRIES", DECEMBER 1974.

Investment alternatives (p.5) The report declares that allocable units can give work to 4,500 people. It does not say what investment is required and so it is not possible to examine their proposals rationally. If they had given the ratios of product to capital (with a reasonable split between the industrial groups) faced with various technological alternatives, it would have been possible to compare investment priorities with the rational use of different technologies in each industry.

Labour composition They forecast a workforce of 2,600 workmen, and almost 2,00 experts, technicians and clerks. This proportion seems to us to be irrational, in consideration of the [illegible] labour requirements in the region. If there are no alternative technologies (which does not seem likely) the contribution made by the proposed industries in absorbing unemployment would be negligible, even to the point of questioning the whole [illegible] of allotting to this sector substantial investments and the intrepreneurial capacity of the subregion.

Electronics and foreign economies (p.5). The report states rather hastily that "the electronics industry is of vital necessity to the healthy progress of the other industries".

One can raise two objections to this:

1) If, in fact, (and it is probable that this is the case in certain fields, although not in the majority) electronics creates important external economies, this does not show the need to substitute imports in this sector: this conclusion would presuppose some comparison of alternative costs.

2) At least a few applications of electronics have shown that they have negative effects on development and on a rational composition of consumption:

a) Some of the applications of electronics are "irrationalisation" measures in the production processes, particularly in the insufficiently developed countries. These innovations do not help towards the rational use of resources and contribute (together with other mechanisms) to the creation of "full unemployment" situations.

b) An important part of the applications of electronics leads to unnecessary complications, which are also expensive, in the manufacturing processes, and have often found a market only through "built-in obsolescence" policies which are irrational.

c) Part of consumer electronics helps to irrationally deform the composition of consumption, by introducing refinements which are hardly of any use into durable consumer goods (in this regard, there is a vast number of articles, from Galbraith and Packard to Riesman etc); or they introduce artifically created needs (like colour TV) which in low-income countries help to an unacceptable degree to irrationalise consumption and lead to the well known effects almost pathologically.

The report includes under envisaged external economies in industry, the need of input , manufacturing industries (such as services and building). The false reasoning behind this is self-evident, since an industry contributes to development through the resources that it provides and through the resources it absorbs. (pp.5-6).

Private profit and rational allotment of resources

The report presupposes (but not proves) that in most cases the investments proposed are privately profitable (p.6). In this case the question arises, why is there a lack of investment in such projects? Is it likely that important investors have not seen the profitability of the industries in such an important package of projects?

In a few cases, however, the investments proposed would not be profitable and would need incentives: in such cases it has to be shown (not presupposed) that they are rational investments, in other words, that they provide the best possible alternative for using the resources ploughed in to them.

There also seems to exist some confusion in the report between two different concepts - "efficiency" and "competitiveness". An industry can be competitive without being efficient: once resources have been allocated, in the absence of alternative uses for the resources, the industry into which the resources have been invested will become more "competitive" so that, at market prices, the product value will exceed current costs: but the investment might

have been irrational - it might, for example, not have been the best possible way in which to utilise the resources. The report seems to use the two expressions as if they were synonyms ("an ultimate goal of the Sectorial Development Program for the Electronic Industry which can compete, not only in the Andean market, but eventually in export markets" p.6).

Protecting the final product and the components

On page 6 the report recognises that increase in price due to protectionism on imports has a great effect on industrial costs; nevertheless they do not propose any explicit recommendations, and simply point out that one must "weight" the use of customs duties on materials and components that are imported.

One ought to be more explicit in suggesting alternatives. Where a components industry needs protection, the industry which uses these components needs additional protection. Either one considers as acceptable a finished product price level which absorbs the twefold protection, or it is preferable to avoid any fresh investments in that sector. Of course it would not be reasonable to cut down on components protection by making use of the existing investments.

Summary of industrial profiles

Table 1 shows a composition of costs which does not offer very favourable prospects for a rational substitution of imports.

For the proposed industries taken as a whole, the value of the imported processed materials and components exceeds 73% of the value of the materials; imported machinery and equipment costs amount to almost 80% of the total; the absorption of

unskilled and skilled labour is virtually negligible (1874) etc.

Supposed analogy with the United States (p.12)

Previous experience is assumed to show ~~would have proved~~ that a model based on United States industry is the best way of studying the same industry in less developed countries. This leaves out of account the fact that factor ratios are different, which means that if to adopt the United States technologies (or, in more general terms, their investment criteria), is almost necessarily irrational in less devloped countries. Certainly it would be preferable to keep the existing investment criteria.

now being used

or used a few years ago in countries which used to be relatively "semi-developed", (such as Japan, Spain, Austria were in the early sixties and Taiwan, Hong Kong etc more recently), using them as a preliminary point of reference, and then introduce modifications based on factor ratios and the general situation of the Andean countries.

Methodological limitations (p.13)

All the features of the Andean countries were determined "on an average basis". Bearing in mind the differences between the six countries (and even between different regions in the same country) its is probable that this average will not be of much use in many cases, at least.

Moreover, the method necessarily excludes a rational choice of technologies, since that presupposes a given factor ratio.

General comments on the industrial profiles

a) All the industrial profiles presuppose one single technology, which by definition excludes the adoption of technologies in

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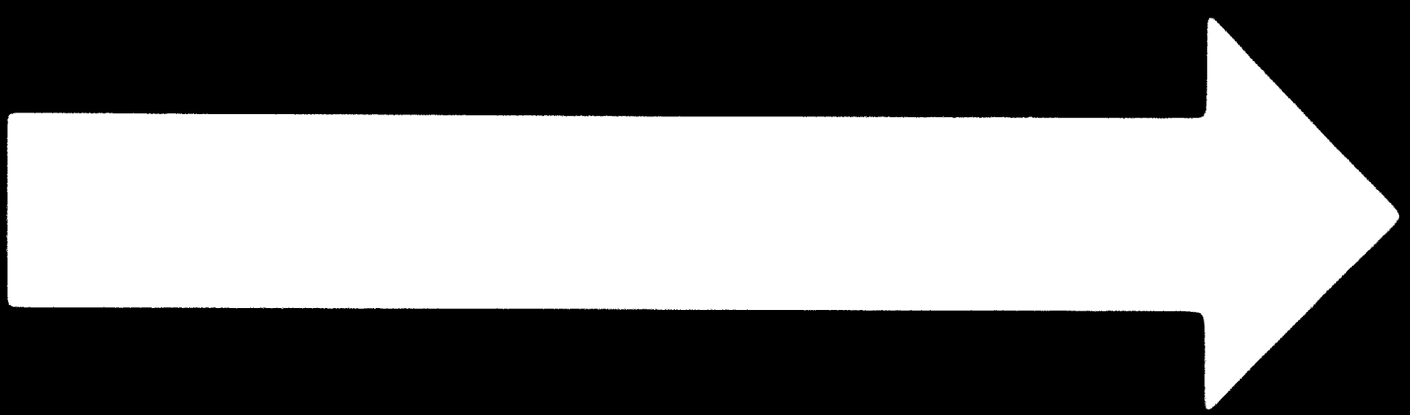

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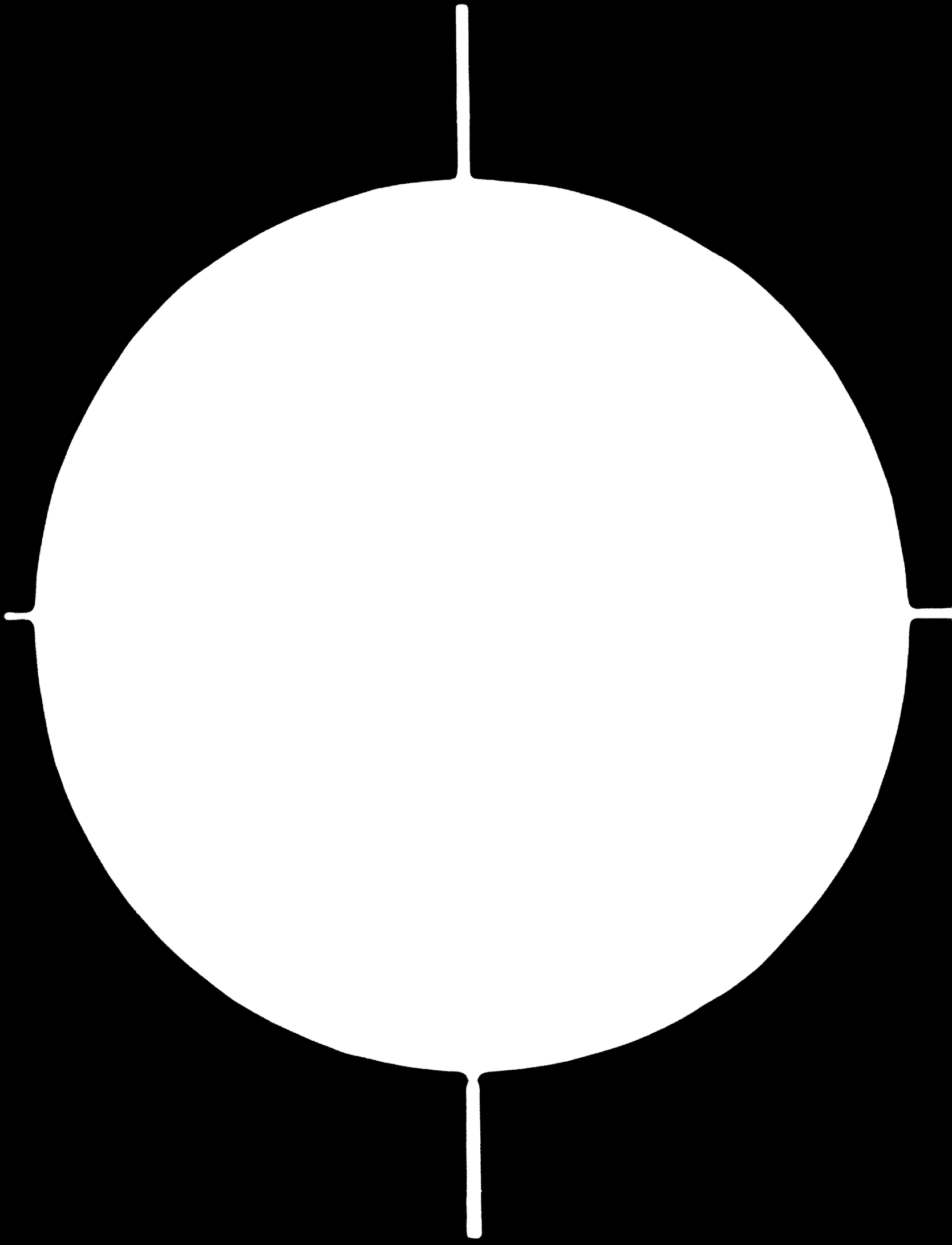

in proportion to factors. They dom not suggest alternatives, either in connection with factor ratio or scope.

b) Even though they note on p.17 the great effect of the cost of materials they do not examine any alternative regarding materials selection.

c) they do not go into the external economies or losses of investment in the service industries, in training programmes etc.

d) They appear to underestimate the importance of economies of scale.

e) The market analysis is clearly inadequate. There is no systematic examination of the probable alternative offers (for example based on the excess capacity of other countries, of investments and investment projects in other countries like Brazil, of the possible competitive capacity, of industries operating with large economies of scale, efficient infrastructures etc). There is no attempt to make a quantitative estimate, however approximate, of the ratio between elasticity:price and elasticity:input of demand.

UNIDO Contract n° 74/84
Activity Group n° 1

APPENDIX 2

Project: Development of the Electronics Industry in the Countries of the Andean Group.

Final provisional report (Phase 1°)

APPENDIX 2.

Development of the electronics industry: advice for the implementation of a further phase of CAF technical assistance.

In the introduction to the present report we mentioned the reasons why it had been decided to postpone the second phase of UNIDO technical assistance to CAF to a more siutable time.

This second and final phase, according to the UNIDO-CITACO contract plans, which have now expired, proposed promoting, implementing and supervising specific industrial projects in the Subregion based on requests made by the Andean Group Member Governments.

Thus we wish to draw up recommendations for defining the characteristics of a new plan which should be based on the following initial hypothesis:

A) Making available the residual funds from Italian Government voluntary contributions for technical assistance to the Andean Group Countries.

B) That CAF should, even generally, draw up one or more development projects for the Electronics and Telecommunications Sector industries in the Andean Subregion, or, if deemed appropriate by CAF, only in certain specific Andean Countries.

C) Making available existing information in the Subregion relative to the sector and to the industrial projects that would benefit from above mentioned technical assistance.

With such data we think it right that for the preparation, negotiation and execution of a new contract we should proceed according to the following programme:

a) At least nine months before the date established for starting the new phase of works, CAF is expected to give UNIDO a list of the industrial projects for which technical assistance is required.

b) Within the next two months UNIDO will be expected to introduce for approval at CAF a provisional paper on the new technical aid plan which will be finalised between CAF and UNIDO at the meeting planned to be held at UNIDO headquarters two months after the introduction of the provisional paper to CAF.
If deemed necessary, CITACO or VITROSELENIA will be able to cooperate for the preparation and drafting of the plan indicating general lines of the project for technical assistance.

c) Within the two following months of the meeting UNIDO will award the new contract which might be finalised later on, and, in any case, at least two months before the date of commencement of work.

d) No more than two months shall elapse between from the date of the contract information and the Commencement of work, during which time, the contractor shall prepare everything necessary to enable the mission in the project area to begin work quickly and thoroughly.

The above-mention programme may be scheduled as follows:

Time (in months)		Work
Partial	Total	
0	0	- GAP requests UNIDO to begin with technical assistance, and presents industrial project list.
2	2	- GAP submits the provisional draft of the new technical assistance project.
2	4	- Final approval given to technical assistance project. Meeting at UNIDO H.Q.
2	6	- Awarding of contract.
1	7	- Formal ratification of contract.
2	9	- Preparatory period of the mission. Commencement of work in the project area.

It should not be overlooked that, in view of the time taken by part of the various Organisms involved, for administrative procedures, and by the international postal service, the 9-month period envisaged for the negotiations is to be considered realistic.

ANNEX A

UNIDO Contract n° 74/24
Activity Group n° 1

Project: Development of the Electronics Industry
in the Countries of the Andean Group

Final provisional report (Phase 1^a)

A G E N D A

The Meeting of the Steering Committee for the "Development of the Electronics Industry in the Andean Pact Countries" Project.

Venue:	CAF Headquarters
Date:	Monday, 13 January 1975
Time:	3.00pm.

AGENDA

1. Summary report of the CAF-CITACO Mission to the Andean Pact countries and the Meeting of Government Experts in the Electronics and Telecommunications Sectors, held in Lima.

2. Examination and discussion of the state of the planning for the Sector, relating to the mission's duties and the implementation of the Programme.

3. Guidelines for the preparation of the forthcoming final programme.

4. Any other business.

The meeting of the Steering Committee of the "Development of the Electronics Industry in the Andean Pact Countries" Project (continued).

held on: Wednesday 15 January 1975
at: CAF Headquarters
at 2.30pm.

AGENDA

1. Presentation of the complete revised report on the CAF-CITACO Mission to the Andean Pact countries.
2. Revision of the programme and plan of action.
3. Any other business.

MEMORANDUM

The minutes of the Meeting of the Steering Committee of the "Development of the Electronics and Telecommunications Industry in the Andean Pact Countries" Project, held on 13 January 1975 at CAF Headquarters;

the following were present: Dr Manuel Arroyo, Resident Deputy Representative of the UNDP; DrLuigi Vianello, Project Director; Dr Humberto Suàrez, Head of the Promotion Unit; Dr Francisco Lira, CAF official for the programme; Dr Raùl Franco, Promotion Unit and Dr Vincenzo Benini, CITACO.

AGENDA

1. Summary report of the CAF-CITACO Mission to the Andean Pact countries and the meeting of government experts in the electronics and telecommunicatéons sector, held in Lima.
2. Examination ad debate on the programming of the sector, in view of the mission's tasks and duties.
3. Guidélines for the drafting of the final fortheoming programme.
4. Any other business.

The agenda was approved.

The time-schedule for the work schedule was reviewed and it was found that it had been carried out with certain non-significant variations.

The introduction, the text and annexes 1 and 11 of the report were distributed.

The introduction to the report was read and discussed.

It was thought unnecessary to read the factual report (Annex 1).

Wide-ranging discussion followed, and certain suggested changes to the text were raised.

Some members of the committee felt that it was necessary to give more detailed comment on the conclusions of the visit, and at the same time requested the meeting should be continued on 15 January 1975 at 2pm to deal with points 2 and 3 on the agenda, since they needed to examine the documents on ~~previous work~~ antecedents which had only just been given to them.

Under any other business, the Project Director pointed out that the mission had had trouble in getting the adequate secretarial facilities.

It was announced that an economics expert would be arriving on 15 January 1975.

The pros and cons of his visit were then discussed, and a request was made for written suggestions regarding the subjects the expert would be asked to work on.

The terms of reference were laid down for the CAF official's visit to ITALY.

The meeting was adjourned until 15 January, by which date the antecedents requested by the Committee would be elaborated.

ANNEX B

UNIDO Contract n° 74/24
Activity Group n° 1

Project: Development of the Electronics Industry
in the Countries of the Andean Group

Final provisional report (Phase 1°)

PROVISIONAL FINAL REPORT

ANNEX B.

3rd Meeting of the Steering Committee for the "Development of the Electronics Industry in the Andean Pact Countries" Project.

Date: 17 March 1975
Time: 2.30pm.
Venue: CAF Headquarters.

PROVISIONAL AGENDA

1. Report of the Vianello-Lira Mission on their visit to Italy and the UNIDO Headquarters in Vienna.

2. Definition of the future programme for the Project.

3. Any other business.

[redacted]

3rd Meeting of the Steering Committee of the "Development of the Electronics Industry in the Andean Pact Countries" Project.

Date: 17 March 1975

Venue: CAF Headquarters

Present: Dr Mario Caraccioli, Deputy Chairman of Operations
Dr Manuel Arroyo, representative of UNIDO
Dr Humberto Suarez, Promotion Director
Dr Luigi Vianello, CITACO
Dr Francisco Lira, CAF representative.

[redacted]

1) Report of the Vianello-Lira Mission on their visit to Italy and the UNIDO Headquarters in Vienna.

2) Definition of the future schedule for the Project.

3. Any other business.

The Vianello-Lira Mission gave a summary report on their survey mission to Italy, which is given as Annex A to this memorandum. The full text of the report on the trip will be given, as soon as the antecedents come to hand that were sent by air mail from Italy. Moreover, the Mission reported on the meetings held with UNIDO officials, to find out what possibility existed for the modification or extension of the first-phase programme. The results of these meetings are given in Annex B to this memorandum.

It was announced that the Head of the Project, Dr Luigi Vianello, had undergone surgery and would not be able to resume work until mid-April; for this reason he was to be allowed to finish his report in Italy.

With regard to the future development of the programme, it was announced that the CAF Coordination Committee had recommended interrupting the programme for a while once the first phase had been completed, since programming in the Sector had been held up and also because the Andean Association of the Electrical and Electronics Industry (ANDINEE) had proposed to request JUNAC to modify certain parts of the electronics programme, at their General Meeting held in Caracas on 28 - 31 January 1975. The parts to be changed related to suggested automatic tariff relaxations on certain household electronic appliances, and also suggested initiatives for the regular supply of raw materials and the harmonisation of Standards and Quality Control.

Previous experience made it possible for the Project Steering Committee to decide to hold up the programme on completion of phase one, and to propose that once the Programme for the Electronics and Telecommunications Sector had been approved, UNIDO should be asked to start phase two, beginning with the sending of an expert to Caracas, to carry out and prepare the programme for the second stage.

It was felt necessary to include suggestions in the final report relating to the best manner of beginning phase two of the Project.

It was agreed that CAF should send all related communications to JUNAC and UNIDO. Dr Vianello thanked CAF officials for their cooperation while carrying out his work.

The work carried out by the economist for the project was announced, and also the fact that he would be submitting a report at the conclusion of phase one.

SUMMARY REPORT OF THE SURVEY MISSION TO ITALY

This is a summary of the survey mission to Italy carried out by Ing.Francisco Lira (CAF) and Ing.Luigi Vianello (CITACO), who visited industries and electronics and telecommunications bodies between 17 January and 15 February 1975.

The visit was run according to the programme worked out and drawn up by CITACO, with the modifications that had been expressly requested by the Mission from Caracas, so that one could get hold of every possible judgement and comparative parameters for future requirements, relating to both industry and infrastructure, in the electronics sector of the Andean Group.

The survey mission was led by an official from STET and meetings were arranged with middle and high-level executives in Italian concerns in this sector, with visits to telephone companies and industrial plants. In this way they got to know the production and applied research processes, which was all duly documented.

The following can be mentioned from among the sectors visited, as being representative of the electronics and telecommunications sector in Italy:

a) Manufacturing industry: In this sector ten firms were visited, mainly concerned with the manufacture of telephones and automatic switching gear, printed circuits, high output integrated circuits, active components, integrated and discrete, heavy electrical engineering, electronic gauges, remote control devices, optical and mechanical precision instruments, professional electronics, commercial electronics, radio communication equipment.

b) Research laboratories and Study Centres - were

Six centres were visited, for research and study in the fields of integrated active components, electronic telephone exchanges, telecommunications, professional and military electronics, electromedicine, rectifiers and super-conductors.

c) Training Centres: In this sector, four centres were visited, offering training of: telephone technicians and operators, management of telephone companies, technicians of customer's firms and technicians in devloping countries.

d) Telecommunications service - In this sector: four concerns were visited, operating in the following fields: susbscriber information by computer methods, telephone directory compliation, centralised materials and communications control via satellite.

e) Miscellaneous bodies and organizations: Bodies were also visited in the following fields: quality control, coordination of telephone concerns in Europe, financing the electronics and telecommunications sector.

These 27 firms were visited in Rome, Naples, Milan, Turin, Genoa, Florence and other minor towns.

The general picture obtained in this sector covers activities over the whole range of modern and advanced development of technology, with a structural and infrastructural technological level of international, or even world, importance as far as the training and professional competence of the technical and administrative staff are concerned.

Nevetheless, evidence was found of the limits to possible expansion, based on the fact that the whole sector is operating under an unprotected national and international market economy, and also under the effects of free competition; this makes it necessary to set decisional targets to forecast advantages which are often not only economic, of basing activity planning in the medium term and with attempts to project into the long-term.

Moreover, one may note that the most important points regarding electronics industrial development in Italy are mainly the following:

a) the capacity for developing and producing original projects and the possibility of rapidly reducing the high cost of the licences required to bring about industrial development.

b) The rational awareness that a certain degree of technological dependence on other countries is necessary in order to manage, at the same time, to become masters in certain fields which are often highly specialised.

It was here that we noted that there was quite a high import quota of components and apparatus, and even machinery, especially in the professional and advanced electronics field.

c) The capacity to join international consortia for the joint development of wide-ranging rpojects with a sizeable technological content.

The Mission was aided everywhere by competent personnel and with great courtesy. In many cases we found an interest in working with the Andean Group at various levels, such as carrying out surveys and projects and jointly working in the field of industrial production.

Then the Mission spent two days in Vienna in unofficial conversations with UNIDO officials, to try to examine the new situation the Mission discovered regarding the supply of technical aid by Citaco, on account of the backwardness of industrial programming in the Andean countries. The following points emerged from these discussions:

1. The technical aid fund made available to CAF by UNIDO is definitely assured.

2. UNIDO has no objections to modifying the technical aid programme for CAF in accordance with the orientation and priority that CAF may wish to give it.

We there drew up a text of proposals regarding the new actions to be undertaken under the CITACO technical aid plan - the ones that had been discussed and agreed to by those present at the meeting, dealing with institutional and industrial infrastructure in the electronics sector and possibly those industrialisation projects which CAF feels can be carried out in the short term.

The text of the proposals will serve as a basis for the decisions that the Steering Committee of the Mission in Caracas will be able to take.

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(signed)
Francisco Lira

ANEXO B

Project XG/ELE/73/032: Development of the Electronic Industry in the Countries of the Andean Group

Notes on informal discussions held at UNIDO Headquarters on 6 and 7 February 1975

Present were:
- Mr. F. Lira, Corporación Andina de Fomento
- Mr. V. Benini, CITACO
- Mr. L. Vismelho, CITACO
- Mr. H. Richard-Foy, UNIDO, Expert
- Mr. F. Norman, UNIDO
- Mr. V. Veltzé-Michel, UNIDO
- Mr. M. Micillo, UNIDO } Part time
- Mr. P. Roberts, UNIDO }

In view of the delay in the assignment of the electronics industry it is proposed to review the activities under the CITACO Contract No. 74/24. The aim of the revie: is to mantain continuity on technical aspects of the work within limits ... of the responsabilities of CAF.

Subject to further study and formal agreement the first phase activities would be directed mainly towards the development of the industrial infrastructure (Institutional set up and ancilliary industries) and items assigned under other sectors.

The first phase would tentatively be:

1) Techno-economical analysis and evaluation of existing infrastructures related to the electronic industry in the Project Area.
2) Identification and socio-economical analysis of possible geographical areas in each country suited for short and medium term development of the infrastructure for the electronic industry in the Project Area.
3) Preparation of an operational programme of the work to be carried out for the development of infrastructures based on the actual situation in the Andean countries as ascertained in activities 1) and 2).
4) Preparation of a operational programme of work to be carried out during the second phase.
5) Define of the requirement and organization, tasks and functions of the Advisory Unit and of CAF counterpart personnel.
6) Upon the request of the CAF prepare feasibility studies and promote manufact... of the following electronic items which have already been assigned within other programmes (List of items to be supplied by CAF).
7) Study tour of 1 month for 1 CAF staff member to Italian Institutes and industrial enterprises in the electronics sector.

It was agreed that Mr. Lira would arrange for a formal request to be submitted by CAF after prior consultation with the JUNTA to UNIDO for a revision of the activities within the present budget, according to the second meeting of the Steering Committee held in Caracas on 13-15 January 1975. Mr. Norman and Mr. Veltze-Michel would submit CAF's proposal to the Committee on Voluntary Contributions and subject to their formal agreement, the Purchasing and Contracting Service would re-negotiate the contract with CITACO.

Upon the recommendations of Mr. Benini and Mr. Roberts, both Mr. Lira and Mr. Veltze-Michel would initiate requests to the JUNTA to release the techno-economic data on the electronics industry, including the data prepared by the UNIDO experts.

Mr. Lira would take up the matter of having adequate counterparts at CAF to carry out the work in collaboration with CITACO, particularly in the second phase. CITACO will give details of their requirements for counterpart staff.

Mr. Lira will discuss with CAF the possibility of doing some work on electronic items already allocated under other programmes (instruments, rectifiers, resistors in Ecuador and ferrites in Bolivia).

Mr. Norman stated that the work should not be undertaken in design, operation and maintenance of telecommunication networks as such work falls within the competence of ITU.

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UNIDO Contract n° 74/24
Activity Group n° 1

Project: Development of the Electronics Industry in the Countries of the Andean Group.

n° VC/RLA/73/082 - 30.1.03

Annex to the Final provisional report (Phase 1^)

Carried out by:
Luigi Vianello, engineer - CITACO -
Head of the Advisory Unit
Electronics Sector
and,
Leone Iraci Fedeli
Economist Consultant

POTENTIAL AND ACTUAL MARKET SURVEY OF THE ANDEAN SUBREGION IN RELATION TO CERTAIN TYPICAL ELECTRONIC AND TELECOMMUNICATIONS PRODUCTS.

FOREWORD

The following information is supplied at the specific request of UNIDO. The authors of the report wish to point out that, although it has the appearance of methodological rigour and statistical validity, the present analysis is based upon information which, for the reasons given in the annexes of the main report, has not been subjected to the scrutiny and cross-checking required to guarantee the premisses on which the estrapolation is based. The extrapolation is therefore inherently uncertain. One should therefore treat the information that follows merely as a starting-point, to be constantly updated and reviewed as the political and economic situations change.

Never the less, the authors trust that the data supplied here may be useful if the assumption that the Andean subregion will follow a similar development pattern that has been followed in the countries of North America and Europe, will prove correct.

1.1. A forecasting method for consumer durables has been adopted, projected until 1985. These commodities are those which typically feature in the general evolution of every country, namely:

- television sets
- telephone equipment
- public telephone exchange lines

These are finished products which can promote a whole set of industrial activities, major and ancillary, for the manufacture of a wide range of components, semiprocessed goods and services.

Due to the lack of any reliable statistical data in chronological sequence, various forecasting methods have been applied to the economies of developing countries. One of the methods, recommended by the International Telecommunications Union (ITU), is based on the correlation between the pro capite income and telephone subscriber density. This method will also be used to forecast the TV density.

1.2. The sources of the data available do not always coincide, and therefore use will be made of the statistics given in the United Nations Statistical Yearbook (1972 edn.) to avoid further uncertainty deriving from the lack of uniformity of the parameters used.

The method is based on an operation of linear regression on the logarithms of the data, to identify the existence of a correlation between the same values which are known to be correlated in highly industrialized countries. This method has already ~~been already~~ been used and explained in a report issued by the Ministry of Telecommunication of the Republic of Brazil, which appeared in the Telecommunications Journal of the UIT (Vol. 40, N° X - Oct. 1973).

1.2.1. The linear regressions thus calculated have given the following densities of the services in question, in proportion to the pro capite average income (IPC) in US dollars:

Television: $\log TV/100 = -1.3425 + 0.7907 \log IPC$.

Telephony: $\log TF/100 = -1.7734 + 0.9397 \log IPC$.

The following parameters have been adopted for these expressions:

TV/100 - density of TV sets per each 100 inhabitants: note however, that this density may also be the figure relating to the number of TV subscriptions taken out by every 100 inhabitants.

TF/100 - density of telephone sets, public and private, connected with a public telephone switching exchange, per each 100 inhabitants.

IPC - the average pro capite income, resulting from the ratio of the gdp to the number of inhabitants.

All the data is taken from the Yearbook mentioned above, (tables 160, 188 & 213) and refer to 1970.
This data, plus the data derived from the application of the expressions given above, are listed below.

The Diffusion of Television and Telephone services
in highly industrialized countries (1970)

N. Country	IPC (in US $)	Telephone density TF/100 actual A	TF/100 calc'd B	Dev. A-B/B	Television density TV/100 actual C	TV/100 calc'd D	Dev. C-D/D
1. Portugal	631	7.8	7.21	+ 8%	4.0	7.4	- 46%
2. Malta	682	12.5	7.35	+ 70	14.5	7.9	+ 83
3. South Africa	804	7.6	9.05	- 16	-	(9.0)	-
4. Cyprus	835	7.1	9.38	- 24	7.8	9.3	- 16
5. Spain	957	13.5	10.66	+ 27	12.4	10.3	+ 20
6. Ireland	1,318	10.4	14.40	- 28	15.2	13.3	+ 14
7. Italy	1,726	17.1	18.55	- 8	18.1	16.5	+ 10
8 Israel	1,836	17.2	19.67	- 13	9.4	17.3	- 46
9. Japan	1,911	25.1	20.42	+ 23	21.5	17.9	+ 20
10. Austria	1,946	19.3	20.77	- 7	19.2	18.1	+ 6
11. Great Britain	2,139	26.7	22.70	+ 18	29.3	19.5	+ 50
12. Finland	2,213	24.9	23.43	+ 6	22.1	20.1	+ 10
13. Holland	2,406	26.0	25.35	+ 3	22.3	21.4	+ 4
14. Belgium	2,651	21.1	27.77	- 24	21.6	23.1	- 7
15. France	2,901	17.2	30.22	- 43	21.6	24.8	- 13
16. Norway	2,931	29.4	30.52	- 4	22.0	25.0	- 12
17. West Germany	3,049	22.5	31.67	- 29	27.2	25.8	+ 5
18. Denmark	3,164.	33.9	32.79	+ 3	26.6	26.6	0
19. Switzerland	3,164	48.2	32.79	+ 47	20.3	26.6	- 24
20. Canada	3,738	45.2	38.35	+ 18	33.2	30.4	+ 9
21. Sweden	4,090	53.7	41.73	+ 28	31.2	32.6	- 4
22. United States	4,747	58.7	48.01	+ 22	41.2	36.7	+ 12

Standard error for TF/100 = 6.90
" " " TV/100 = 4.21

1.2.2. Because of the high correlations [illegible] the expressions, namely a coefficient of correlation r = 0.87 for telephones and r = 0.83 for television, it is possible to compute the deviations based on the development of these services and the average per capita income in each country for the Andean Group countries, compared with those in the more highly developed countries.

Country	IPC 1970 US$	TF/100 actual A	TF/100 calc'd B	Dev. A-B/B %	[illegible] actual C	[illegible] calc'd D	Dev. C-D/D %
Bolivia	206	0.9	2.0	- 55	0	3.1	- 100
Ecuador	269	2.1	3.2	- 34	2.5	3.	- 34
Peru	400	1.7	4.[illegible]	- [illegible]	[illegible]	[illegible]	- 44
Colombia	409	3.8	4.3	- 21	3.[illegible]	[illegible]	[illegible]
Chile	755	3.7	8.[illegible]	- [illegible]	5.1	[illegible]	- 40
Venezuela	999	3.9	11.1	- [illegible]	[illegible]	15.[illegible]	- [illegible]
Sub-region A.	527	3.0	[illegible].1	- 51	3.9	[illegible]	- 3[illegible]

The deviations for the Subregion (-51% for telephones and -[illegible]% for television) are certainly large but not to such an extent that they cannot be overcome, if this is the line of development desired.

1.2.3. In the following analyses, the development forecasts for the population of the whole Andean area will be used, as derived from the Statistical Yearbook. Similar forecasts have also been carried out by official bodies within the Andean nations: they are given in brackets to show once again, the uncertainty of these forecasts.

Forecast for the Population Growth of the Andean Group

Country	Source	Population in thousands for the years: 1970	1975	1980	1985
Bolivia	UN	4,658	5,272	5,808	6,853
	JN		(5,911)	(6,934)	
Colombia	UN	21,363	25,448	30,253	35,645
	JN		(24,718)	(29,925)	
Chile	UN	9,780	10,937	12,214	13,609
	JN		(11,100)	(13,000)	
Ecuador	UN	6,089	7,203	8,526	10,085
	JN		(7,294)	(8,520)	
Peru	UN	13,587	15,870	18,529	21,614
	JN		(16,471)	(19,561)	
Venezuela	UN	10,755	12,750	14,979	17,350
Totals	UN	66,232	77,480	90,309	105,134

NB. UN - data from the UN Statistical Yearbook
JN - data provided by the Junta of the Cartagena Pact.

1.2.4. The values of the potential market relate to the economic development of the Subregion on the basis of the official forecasts drawn up by the Community. It is believed that one can assume that the annual growth development in each country, and therefore that of the whole Community, will be 7% for each year from 1970 to 1985.

The following tables have been calculated on the basis of this hypothesis, and taking into account the forecast increase of the population

The situation of telephone and television services in 1970 and the corresponding general economic situation.

Country	IPC (US $)	Population (thousands)	GDP US $m	TF/100	Telephones (thousands)	TV/100	Television sets (thousands)
Bolivia	206	4,658	959.5	0.9	41.9	0	0
Ecuador	269	6,089	1,637.9	2.1	127.9	2.5	152.2
Peru	400	13,587	5,434.8	1.7	231.0	2.9	394.0
Colombia	409	21,363	8,737.4	3.8	811.8	3.8	811.8
Chile	755	9,780	7,386.9	3.7	361.9	5.1	498.8
Venezuela	999	10,755	10,744.2	3.9	419.4	7.0	752.8
Subregion		66,232	34,897.7		1,993.9		2,609.6

Forecast of the economic development of the Andean Subregion 1970-1985.

Country	IPC 1970 (US $)	Population 1970 (thousands)	GDP 1970 (US $m)	GDP 1985 (US $m)	Population 1985 (thousands)	IPC 1985 (US $)
Bolivia	206	4,658	959,5	2,647.2	6,833	387
Ecuador	269	6,089	1,637.9	4,519.0	10,083	448
Peru	400	13,587	5,434.8	14,994.6	21,614	693
Colombia	409	21,363	8,737.4	24,106.5	35,645	676
Chile	755	9,780	7,383.9	20,372.2	13,609	1,497
Venezuela	999	10,755	10,744.2	29,643.2	17,350	1,708
Subregion		66,232	34,897.7	96,282.7	105,134	

Calculation of the theoretical expansion of telephone sets in the Subregion, between 1970 and 1985

Correlation: log TF/100 = - 1.7734 + 0.9397 log IPC

Country	IPC 1970 (US $)	TF/100 (actual) 1970	IPC 1985 (US $)	logIPC	0.9397 logIPC	logTF/100	TF/100 1985	Population (thousands)	Telephones (thousands)
Bolivia	206	0.9	387	2.587	2.431	0.658	4.7	6,833	321.1
Ecuador	269	2.1	448	2.652	2.492	0.719	5.2	10,083	524.3
Peru	400	1.7	693	2.841	2.670	0.897	7.9	21,614	1,707.5
Colombia	409	3.8	676	2.830	2.659	0.886	7.7	35,645	2,744.6
Chile	755	13.7	1,497	3.175	2.893	1.210	16.2	13,609	2,204.6
Venezuela	999	3.9	1,708	3.233	3.037	1.264	18.4	17,350	3,192.4
Subregion●								105,134	10,694.5

Estimate of the theoretical expansion of TV sets in the Subregion between 1970 and 1985

Correlation: log TV/100 = - 1.3425 + 0.7907 log IPC

Country	IPC 1970 (US $)	TV/100 (actual) 1970	IPC 1985 (US $)	log IPC	0.7907 logIPC	log TV/100	TV/100 1985	Population (thousands) 1985	TV sets (thousands)
Bolivia	206	0	387	2.587	2.045	0.703	5.0	6,833	341.6
Ecuador	269	2.5	448	2.652	2.097	0.755	5.7	10,083	574.7
Peru	400	2.9	693	2.841	2.246	0.904	8.0	21,614	1,729.1
Colombia	409	3.8	676	2.830	2.238	0.896	7.9	35,645	2,815.9
Chile	755	5.1	1,497	3.175	2.510	1.168	14.7	13,609	2,000.5
Venezuela	999	7.0	1,708	3.233	2.556	1.214	16.4	17,350	2,845.4
Subregion								105,134	10,307.2

Potential market in the Subregion between 1970 and 1985

Country	Thousands of telephone sets				Thousands of [illegible]			
	1985	1970	1970-85	Annual	1985	1970	1970-85	Annual
Bolivia	321.1	41.9	279.2	18.6	341.6	0	341.6	22.8
Ecuador	524.3	127.9	396.4	26.5	574.7	152.2	422.5	28.2
Peru	1,707.5	231.0	1,476.5	98.5	1,729.1	394.0	1,335.1	89.0
Colombia	2,744.6	811.8	1,932.8	128.8	2,815.9	811.8	2,004.1	133.6
Chile	2,204.6	361.9	1,842.7	122.8	2,000.5	498.8	1,501.7	100.1
Venezuela	3,192.4	419.4	2,773.0	184.8	2,845.4	752.8	2,092.6	139.5
TOTALS	10,694.5	1,993.9	8,700.6	580.0	10,307.2	2,609.6	7,697.6	513.2
Subregion	10,723.6	1,993.9	8,729.7	582.0	10,513.4	2,609.6	7,903.8	527.0

The following conclusions may now be deduced from the Potential Market table:

1. the expansion of the services under review would have the following approximate percentage increases, at a constant rate of increase:

- 9.5% per annum for TV sets
- 12% per annum for telephone sets

2. the expansion of the services under review would have the following initial approximate percentage increases, at an absolute constant annual rate of increase:

- 19.5% for TV
- 29% for telephony

In both cases, the rates of increase are above all the average in particular for telephony. However, such constant percentage rates of increase are not unreasonable since they have been verified in other countries, even over shorter periods of time.

In Italy, the SIP Telephone Corporation has undertaken a thorough programme for the extension of public telephone installations for the period 1964-1974

This programme, which put both the Telephone Corporation itself and the manufacturing and installation industries to a great deal of effort, increased the telephone density from 10.7 to 24.6 telephones per 100 head of population, at an annual rate of increase of 8,7%, with investments totalling over 500m US$ per year: this is equal to over 1,500 US$ for each new subscriber.

1.2.5. In view of what has been said above, it may be advisable to suggest an alternative objective which will offer a realistic lower development limit, and thereby assume that the upper limit should be the one centred upon the general trend.
Notice that the average negative deviation of these services in the more industrialized countries are as follows:

A. Television: -18.7, which equals a density for TV users (or TV set) of 81.3% of the general trend.

B. Telephony : -19.6%, which equals a density for telephone switchboards (or telephone sets) of 80.4% of the general trend.

If we take these values to be the minimum development figures, by 1985 the following situation should exist:

A. Television: - total average expansion: 10,307,000 TV sets
- total minimum expansion: 8,380,000 TV sets
- annual average expansion rate: 9,5%
- annual minimum expansion rate: 8,0%

B. Telephony: - total average expansion: 10,695,000 telephones
- total minimum expansion: 8,600,000 telephones
- annual average expansion rate: 12%
- annual minimum expansion rate: 10%

At constant annual rates, the demand would be as follows:

A. Television sets: - annual average demand: 513,000 sets
- annual minimum demand: 385,000 sets

B. Telephone sets : - annual average demand: 580,000 sets
- annual minimum demand: 440,000 sets

1.2.6. On the basis of the international market values for 1970, and taking into account a customs tariff barrier for subregional output of not more than 30% (although this barrier will, of course, have to be gradually lowered in order to enter the export market), the annual market for the commodities in question may be estimated as follows:

Black-and-white TV sets: average international price: 250 US $

- average market = 250 x 1.3 x 513,000 = 166.7m US $
- minimum market = 250 x 1.3 x 385,000 = 125.2m US $

Telephones, conventional, international price: 16 US $

- average market = 16 x 1.3 x 580,000 = 12.0m US $
- minimum market = 16 x 1.3 x 440,000 = 9.2m US $

Note that at least up until 1975 no colour TV programmes have been started in the subregion: if this should happen before 1980, the probable low percentages of initial demand should not alter the above estimates beyond the limits of their approximation, and can therefore be ignored.

1.2.7. From the above estimates for telephone sets, one can now arrive at a fairly accurate estimate for the public telephone exchange lines to which the new subscribers will be connected.

In the subregion there are, as far as known, and depending from the source, from 1.28 to 1.32 subscribers per exchange line; the variations in each individual Andean country are much larger than this. Taking an overall view of the situation, therefore, we shall take 1.3 tele phones/line to be the most representative figure.

Hence the potential market for switching exchanges should be:

(average) 8,700,000: 1.3 = 6,690,000 lines, & 446,000 lines p.a.
(minimum) 6,600,000: 1.3 = 5,080,000 lines, & 338,000 lines p.a.

At the international price of 135 US $ x line, the market may be calculated as:

- average market - 135 x 1.3 x 446,000 = 78.3m US $
- minimum market - 135 x 1.3 x 338,000 = 59.3m US $

1.2.8. To summarize and with a few simple calculations, the following breakdown results, rounded off to the last figure:

Market estimates in the andean subregion for the following products:

Television sets, telephones and urban telephone exchange lines during the period 1970-1985.

Maximum and minimum development forecasts.

	Expansion of services by 1985				Expansion of services period 1970-1985				Annual demand during 1970 - 1985			
	average		minimum		average		minimum		average		minimum	
	Quant.	Dens.	Quant.	Dens.	Quant.	Value	Quant.	Value	Quant.	Value	Quant.	Value
TV sets	10,307	10	8,380	8.0	7,697	2,500	5,090	1,880	513	166.7	385	125.2
Telephones	10,695	10.2	8,600	8.2	8,700	180	6,600	129	580	12.0	440	9.2
Lines	8,227	7.8	6,615	6.3	6,690	1,175	5,080	891	446	78.3	338	59.3
Telephony : Totals						1,355		1,020		90.3		68.5

NB : The figures are all in thousands.

The density is per 100 head of population

Values are given in US $m.

1.3. The size of the markets in the Andean countries, indicated above are sufficient to justify close government interest as well as that of entrepreneurs and industrialists. It is therefore possible that firm manufacturing efforts may conquer substantial areas of the market.

We therefore make the following assumptions:

The domestic TV sector : after 1980 it will already be possible to capture 90% of the market : the remainder will be absorbed by a demand for performance or appearance above the average.

The telephone sector:

- switching exchange apparatus - a share of about 80% of the market, probably as from 1982. This level will not be economically susceptible of increase, unless perhaps at a later stage, since changes in the technologies in this sector will demand fairly long-term transformations in the manufacturing processes already under way : it will be necessary therefore to resort to import quotas particularly for such equipment which, because of its high degree of specialization, would not be suitable for manufacture in the Subregion;
- telephone sets: no real problems are foreseen in capturing the whole market. In order to allow for the importation of highly advanced or specialized equipment, we set the market share at 95%.

On this basis, the size of the markets covered by production in the Subregion could be as follows:

Forecast for subregional output to satisfy home demand.

	Annual Subregional demand				Share of market	Annual Subregional output demand			
	maximum		minimum			maximum		minimum	
	Quant.	Value	Quant.	Value		Quant.	Value	Quant.	Value
TV sets	513	166.7	385	125.2	90%	514	150.0	346	113.7
Telephones	580	12.0	440	9.2	95%	551	11.4	416	8.7
Exchange lines	446	78.3	338	59.3	80%	357	62.6	270	47.3
Telephony:totals		90.3		68.5			74.0		56.0

NB : Figures are expressed in thousands

Values are expressed in US$m.

1.4 With reference to the two activities examined so far from the macroeconomic point of view, it is not possible to examine the feasibilities at industrial level, since the Mission as mentioned in other parts of the Report did not have the authorization to gain access to the data in the hands of the JUNTA, or to carry out industrial surveys as such.

However, other UNIDO experts who were working at the same time on tasks entrusted to them by the JUNTA, were in a position to examine a set of working documents (e.g. "Proyecto Industrial Multinacional Andino" - Documento J-21 Unidad de Industrial) on which they based a whole series of forecasts within the framework of the surveys carried out by the JUNTA.

The North American "Stanford Research Institute" in California was also engaged by the JUNTA to draw up an industrial feasibility study on the electronics sector, based on data supplied by the JUNTA: the report was submitted to JUNTA and CAF.

Since the Mission has only seen the final results of the work performed by these experts and by SRI, it is only able to remark that there is a certain difference of unknown origin between the two sets of results.

As far as the telephone sector alone is concerned, the information that follows has been obtained : the expert's reports are marked (1°) and (2°), and it should be mentioned that during the Mission work in the Subregion neither of them had yet been published or officially acknowledged.

Comparison of the analyses produced by different sources in the industrial feasibility of production units in the area of telephony materials and for the Andean subregional market.

Product	Source	Producer's sales volume (US $m.)	Product unit price Internat. (US$	Subregion US$	Quantity produced (000)	N° of employees	Sales/employee US$)
Telephone	SRI	=	=	=	=	=	=
	(1°)	4,740	13.0	15.8	300	127	37,000
	(2°)	10,080°	=	=	=	300	30,000
PABX Lines	SRI	9,300	150.0	150.0	62	135	21,400^
	(1°)	5,950	110.0	148.8	40	417	14,300^
	(2°)	2,300°	=	=	=	540+	16,300^
Public Exchange Lines	SRI	=	=	=	=	=	=
	(1°)	23,840	104.0	119.2	200	1,360	12,800^
	(2°)	72,180°	=	=	=	2,900+	25,000

NB : ° Market share
+ Total of 3,350 staff subdivided into 4 production units
^ Approximate values of the last-but-two figure

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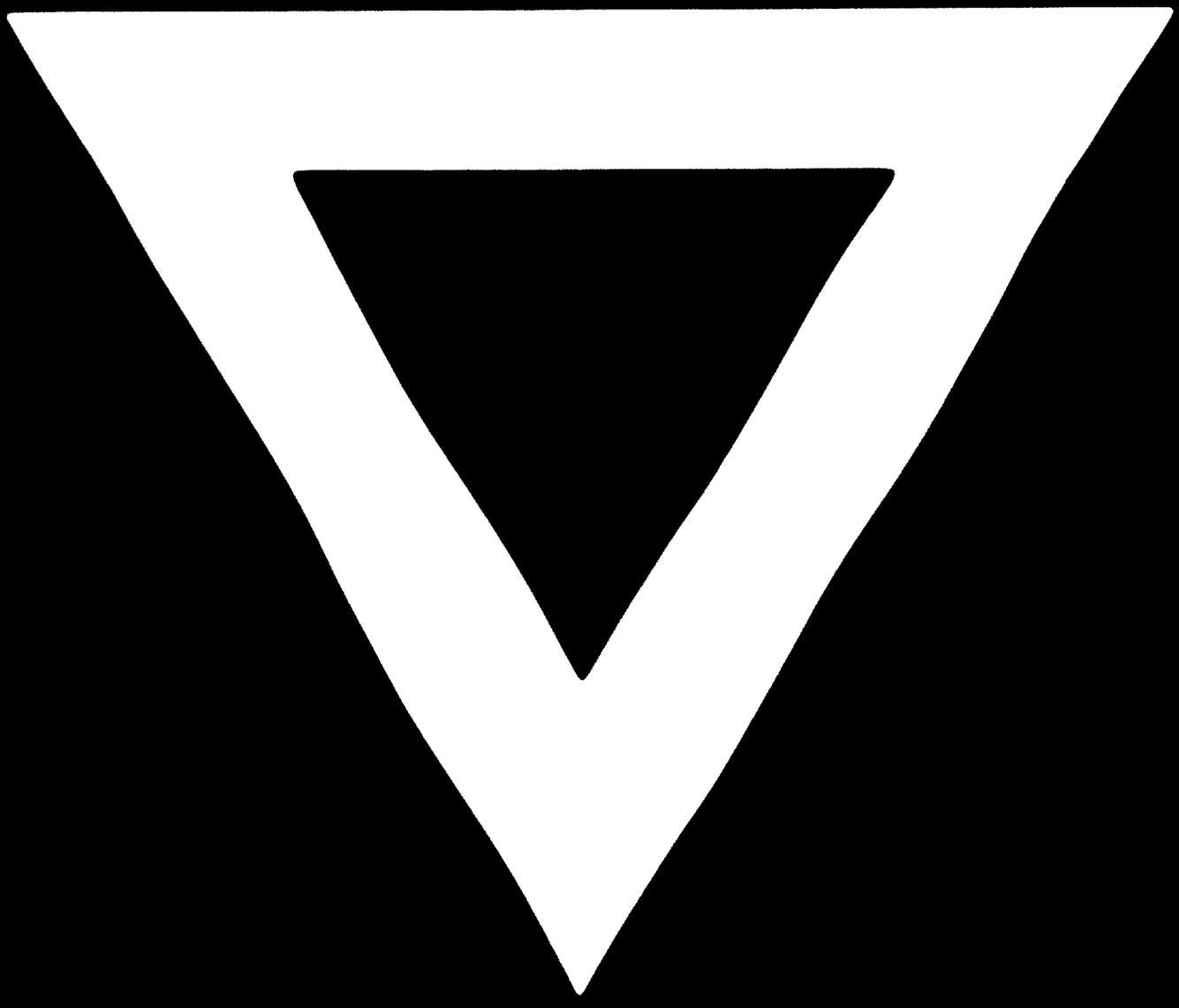

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