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The University of Ottawa

SYNCHRONIZED REGIONAL GROWTH AND JOINT VENTURES
IN THE ALUMINUM INDUSTRY IN VENEZUELA

by

Juliusz M. Walecki

A Thesis

Submitted to the Faculty of Graduate
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To My Parents : Stefania and Julian

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C O N T E N T S

ACKNOWLEDGEMENTS	iii
LIST OF TABLES	x
LIST OF ILLUSTRATIONS	xv
CHAPTER	
I INTRODUCTION	1
Conceptual Framework and Objectives	3
Basic Concepts	3
Objectives	6
Methodology	7
Data Gathering and Questionnaires	7
Study Plan	9
Regional Development Theory	12
Open and Closed Systems	14
Two Models of Regional Growth	15
Growth Pole / Growth Center Concept	17
New Trends in Regional Development Theory	21
Role of Geography	24
Conclusion	27
II A STRATEGY OF SYNCHRONIZED REGIONAL GROWTH	29
Introduction to A Synchronized Growth Strategy	29
Development Goals and Synchronization Processes	29
Synchronized Growth and Comparative Advantage	34

Development Agents in Synchronized Growth	41
Role of MNCs in Regional Development	42
Role of Government in Synchronized Growth	49
Conditions for Development Agents	53
Technology as Missing Factor	56
'Appropriate' Technologies	58
Technology Choices	59
Role of Space in A Strategy of Synchronized Growth	64
Concept of Economic Space	64
Spatial Consequences of the New Strategy	68
Joint Ventures as Development Agents	71
Definition of Joint Ventures	71
Advantages and Disadvantages of Cooperation	73
Conditions for Joint Ventures	77
Conclusion	81
III VENEZUELA'S ECONOMIC GROWTH AND SPACE ECONOMY	83
Main Characteristics of Venezuela's Economic Growth	83
Government Intervention	86
Dominance of the Oil Sector	97
Manufacturing Industries	103
Employment Problem	115
Economic Use of the Venezuelan Space	122
Migration Pattern	123
Spatial Concentration of Manufacturing	130
Conclusion	136

IV	TOWARDS SYNCHRONIZED GROWTH IN VENEZUELA'S REGIONAL DEVELOPMENT	138
	Initiating Synchronized Growth	138
	New Institutions : CORDIPLAN	139
	Industrial Policies	140
	International Synchronization Processes : Andean Pact	143
	Imports of Technology	153
	New Approach to Regional Development : CVG	159
	Development Agent for Periphery	159
	Guayana Development Program	161
	Spatial Aspects of the Program	174
	Evaluation of Guayana Development	181
	Speculations about the CVG's Future	189
	Conclusion	194
V	INTERNATIONAL SPACE OF THE ALUMINUM INDUSTRY	199
	Main Characteristics of the Aluminum Industry	200
	Basic Technologies	203
	Structure of the International Aluminum Industry	211
	International Location Pattern	230
	Expansion Prospects for the Aluminum Industry	239
	Consumption of Aluminum	239
	Development of New Technologies	250
	Planning Venezuelan Aluminum Industry	255
	Comparative Advantage	255
	Conclusion	263

VI	JOINT VENTURES IN VENEZUELAN ALUMINUM INDUSTRY	265
	New Development Agents	265
	ALCASA	266
	VENALUM	271
	INTERALUMINA	278
	BAUXIVEN	281
	Conclusion : Progress in Synchronization Processes	284
	Joint Ventures' Role in Regional Development	286
	Economic Growth	287
	National and Regional Linkages	290
	Consumption of Energy	301
	Generation of Employment and Incomes	306
	Exports of Aluminum	314
	Conclusion : Expansion of Economic Spaces	321
	Technology Choices and Transfer of Knowledge	323
	ALCASA	323
	VENALUM	327
	INTERALUMINA	330
	BAUXIVEN	331
	Conclusion : Contribution to Creation of Local S & T Capacities	332
VII	FINAL COMMENTS	345
	Limits of the Study	345
	Concluding Comments	347
APPENDIX	I	355

APPENDIX	II	.....	364
APPENDIX	III	.....	366
BIBLIOGRAPHY		.....	370

ABSTRACT

LIST OF TABLES

1.	Indicators of Foreign Participation in Industries of Selected Host Countries	47
2.	Gross Domestic Product by Sector	87
3.	Gross Domestic Product by Sector (Constant Prices)	88
4.	Officials' Evaluation of the Importance of Foreign Investment for their Nations' Economic Development	92
5.	Attitudes Towards MNCs of Elites in Venezuela	93
6.	Oil Production; Exports and Consumption	100
7.	Oil Sector: Exports, Incomes and Employment	101
8.	Venezuela: Exports by Main Products	102
9.	Economic Growth of Venezuelan Economy	104
10.	Gross Domestic Product by Sector (Vth National Plan)	105
11.	Gross Production Value in Manufacturing	107
12.	Prices by Main Groups of Products	108
13.	Value Added in Manufacturing	109
14.	Inputs in Manufacturing Sector by Origin - 1971	111
15.	Inputs in Manufacturing Sector by Origin - 1977	112
16.	Venezuelan Export Volume and Price and Import Price Index	113
17.	Employment in Manufacturing Sector	117
18.	Earnings per Employee	119
19.	Venezuelan Labor Force: Educational Levels	120
20.	Internal and Foreign Migration, Venezuela 1936-1950	125

21.	Population of Venezuela by Regions and Migrations	126
22.	Distribution of Venezuelan Population	127
23.	Industrial Investments by Regions	131
24.	Economic Variables at Regional Level	133
25.	Distribution of Family Incomes by Regions	135
26.	Planned Public Investment 1976-1980	142
27.	Public and Private Investment in Venezuela	144
28.	Government Expenditures by Category	145
29.	Officials Evaluation of Governmental Implementation of Decision 24	151
30.	Changes in the U.S. Direct Investment Position in Latin America, in Manufacturing	154
31.	Number of Subsidiaries Established by U.S. MNCs' Before and During the Andean Code	155
32.	Venezuela: Plan de la Nacion, Investment Targets and the Role of the Guayana Program	163
33.	Preliminary Production Goals for Guayana, 1964 & 1970	165
34.	Guayana Region: Growth and Development Targets 1961-1980 as Per Cent of Venezuelan Total	167
35.	Gross Production Value by Sectors and Regions	168
36.	Fixed Capital by Sectors and Regions	170
37.	Value Added by Sectors and Regions	171
38.	Employment by Regions and Sectors	172
39.	Employment by Sectors and Regions (percentages)	173

40. Supply of Education Projected for the Schools of Ciudad Guayana Compared with Labor Force Demand	180
41. CVG's Subsidiaries and Mixed Capital Companies	188
42. Allocation of Funds and Incomes of the Venezuelan Investment Fund	191
43. Allocation of Funds by the Venezuelan Investment Fund in the Manufacturing Sector	192
44. Annual World Production of Aluminum	201
45. Estimated Costs of Producing Alumina	205
46. Estimated Costs of Smelting Aluminum	210
47. Bauxite, Alumina and Aluminum Capacities of Major Integrated Firms	212
48. Comparison of Aluminum Costs with List Price of Aluminum	219
49. Aluminum Company of America, Principal Subsidiaries and Affiliates	223
50. Alcan Aluminium Ltd., Principal Subsidiaries and Related Companies	224
51. Reynolds Metals Co., Subsidiaries and Associated Companies	225
52. Reynolds Metals Co., Main Activities by Geographic Location	226
53. Kaiser Aluminum and Chemical Corp., Subsidiaries and Affiliated Companies	227

54.	Swiss Aluminum and Chemical Corp., Subsidiaries and Affiliated Companies	228
55.	Pechiney - Ugine - Kuhlmann, Subsidiaries	229
56.	Estimates of Primary Aluminum Production Capacity	232
57.	World Production of Aluminum	233
58.	World Production of Bauxite	237
59.	World Production of Alumina	238
60.	Aluminum in Packaging	242
61.	Estimates of Primary Aluminum Consumption	244
62.	World Consumption of Aluminum	245
63.	Consumption of Aluminum by Major Sectors as Per Cent of Total Aluminum Consumption	246
64.	World Trade in Unwrought Aluminum	248
65.	Tariffs and Duties on Aluminum and Related Products in the U.S. and E.E.C.	249
66.	Fixed Capital per Employee	256
67.	Gross Production Value / Fixed Capital in Manufacturing	257
68.	Value Added / Fixed Capital in Manufacturing	258
69.	Import Tariffs for Aluminum and Aluminum Products in Venezuela	262
70.	Guayana Region, Industrial Program (Vth National Plan): Aluminum	268
71.	Guayana Region, Industrial Program (Vth National Plan): Aluminum for Export and Alumina	273
72.	Production of Aluminum in Venezuela	288

73. Production Targets for Guayana Industries	291
74. Iron & Steel Industry: Volume of Production	292
75. Iron & Steel and Aluminum Industries (Guayana Region)	294
76. Consumption of Aluminum in Venezuela	297
77. Sales of Aluminum and Aluminum Products by Alcasa	299
78. Sales of Aluminum by Venalum	300
79. Generation and Consumption of Energy	302
80. Consumption of Electric Energy by Industries - 1971	304
81. Consumption of Electric Energy by Industries - 1977	305
82. Employment in Manufacturing (Guayana Region)	307
83. Employment in the Venezuelan Aluminum Industry	308
84. Gross Production Value per Employee	310
85. Value Added per Employee	311
86. Exports and Imports of Aluminum and Aluminum Products	315
87. Exports of Aluminum by Alcasa	316
88. Export Incentives in Venezuela	318
89. The Principal Production and Export Goals for 1980	319
90. Iron & Steel Industry, Exports	320
91. Basic Materials' Consumption for the Reynolds' Low Density Reduction Cell	325

LIST OF ILLUSTRATIONS

I FIGURES

1.	The Product Life Cycle Concept Restructured	39
2.	Crude Oil Production	98
3.	Ciudad Guayana: Distribution of Population	178
4.	Cross - Section of an Electrolytic Cell Fitted with a Söderberg Anode	366
5.	Cross - Section of an Electrolytic Cell Fitted with Pre-Baked Anodes	367
6.	Schematic Diagram for Aluminum Smelting	207
7.	Production of Aluminum from Bauxite	209
8.	World Aluminum Prices	220
9.	Schematic Diagram of the Alcoa's Aluminum Chloride Electrolysis Process	368
10.	Schematic Diagram of the Alcoa's Cell for Electrolyzing Aluminum Chloride	369
11.	Production of Aluminum in Venezuela	289
12.	Simplified Linkages in the Venezuelan Aluminum Industry ...	293
13.	Flow Sheet for Aluminum Smelting (Alcasa & Venalum)	326
14.	Cross - Section of Reynolds' "Niagara" Cell	329

II MAPS

1.	Venezuela, States	84
2.	Migration Pattern, Main Centers of Attraction	124

3.	Venezuela, Administrative Regions	128
4.	Venezuela, Major Growth Centers at the National Level	175
5.	Guayana Region, Natural Resources	177
6.	Ciudad Guayana, Industrial and Residential Zones	279
7.	Guayana Region and Los Pijiguaos	283

III PICTURES

1.	El Pao, Bolivar State	196
2.	Ciudad Guayana (Puerto Ordaz) (2)	197-198
3.	Alcasa (2)	334-335
4.	Venalum (2)	336-337
5.	Interalumina (Construction Stage)	338
6.	Los Pijiguaos	339
7.	Bauxite Rock, Los Pijiguaos	340
8.	Aluminum (Alcasa)	341
9.	Guri Dam (Construction Stage)	342
10.	Alcasa, Potline	343
11.	Venalum, Potline	344

Theories are never proved to be generally true, the ones in which we believe represent the best approximations to truth at any one time (A.G. Wilson)

CHAPTER I

INTRODUCTION

Regional problems in most countries do not seem to be easily solved with the use of traditional policies. While development problems have multiplied, regional theory has been lagging behind.

Venezuela, as other Latin American countries, has been recently under strong pressure to establish more public control over its national resources and development processes in general. The main reasons behind this are viewed as an attempt to stimulate more national and regional economic growth, to create employment opportunities and to reduce income disparities. On the other hand, private capital, whether domestic or foreign, will normally aim at increasing its revenues without much concern given to social issues. To the extent that these different objectives will lead to different courses of action, the potential exists for continuous conflict between private sector on the one side, and the national and regional governments on the other. The nationalisation of the economic sectors and more protectionism at the present stage of the country's development may not be able to solve the existing problems. Venezuela lacks important production factors, such as technology and skilled labor, if it wants to depend exclusively on its own resources. Also it does not have a large enough market to justify development of a large number of economic activities, except those in which the country can become competitive in exports. Pursuing certain nationalistic policies may further

narrow the country's economic space and contribute to new regional problems.

Instead, it is suggested that Venezuela should try to promote a synchronized growth strategy based on economic cooperation with the private sector. This approach requires creation of new development agents and harmonization of interests and actions between different regional actors which is preferred to confrontation with other partners in development. The discussed strategy consists in having the potentially conflicting agents negotiate synchronized courses of action on the part of each agent which will not be excessively detrimental to the main objectives which each agent would normally pursue, and thereby avoid the generalized loss resulting from situations of repeated conflict.

One form of development agent could be a joint venture with local-public and foreign-private investors. Joint ventures may serve the interests of regional development better than dependence on public enterprise or subsidiaries of trans-national corporations, as they offer the prospect of combining the advantages of private and public enterprises.

Before outlining the objectives of this thesis, it will be useful to specify three basic concepts which will be central to our subsequent discussion, the concepts of synchronized growth, development agent and economic spaces.

Conceptual Framework and Objectives

Basic Concepts

'Synchronized Growth' is understood to be an evolving development strategy rather than some sort of an 'ideal state' that a country or region should strive to achieve. (The term synchronize here means : a. to operate in unison and b. to cause to coincide with an action.) The main goals of synchronized growth are no different from those development objectives defined recently by theorists and policy makers. The strategy proposed here is based on making attempts at a continuous coordination of interests and actions between different development actors, including private companies, public agencies and mixed enterprises, with an active role played by the state. The degree of coordination or operation in unison will vary depending on the economic, social and political environment of a given country or region. It is possible that less advanced stages of development will require more harmonization efforts and more government involvement than in mature economies. 'Synchronized growth' promotes gradual changes in institutional structures through introduction of new dynamic institutions or 'development agents' which are designed so as to serve better the pre-defined but changing regional and national interests. The introduction of our approach will not guarantee 'balanced growth'. Indeed, 'synchronized growth' will likely encourage 'unbalanced growth' as a motive power of the economy, but the number of undesi-

rable sectoral and geographic disequilibria will probably be reduced gradually in the process of development. The strategy is recommended especially for mixed economies with significant regional disparities, where neither private nor public capital have been successful in solving development problems through their own actions.

'Development Agent' is defined as a dynamic institution which plays a central role in synchronized growth. It could be a private company, state enterprise, public agency or mixed public-private institution. Any regional actor to be classified as 'development agent' must satisfy certain conditions which are explained in Chapter II. Development agents should encourage more complex forms of cooperation and eliminate or reduce the risk of confrontation between partners in development. This does not mean that the competitive market forces have to be automatically eliminated. The economic success of a development agent is measured in terms of the profitable expansion of its economic space. The new institutions should be capable of generating or transferring innovations that will stimulate regional and national growth.

'Economic Space' - similarly to people, each institution or development agent establishes its own operation space within which most of its functions will take place. Just as our individual activities are not limited to our places of residence and work, so a development agent's functions are not restricted to its physical location or a single region. Economic space consists of the set of relationships with other development agents (both private and public) through purchase, transformation and sale of goods and services, in the case of productive agents, and, in addition, relationships of regulation and of modification of economic incentives of other agents, in the case of non-productive agents. Economic space may be affected not only by strictly economic factors

but is also subject to progress in technology as well as to political and social influences. For that reason in many cases it is not sufficient simply to examine input-output tables in order to assess the size and nature of economic spaces. There is no single measure yet that can be applied to discerning economic spaces. For the practical purpose of this study simple traditional ratios will be used. They should help us to determine whether positive or negative changes have occurred within the economic spaces of certain 'potential' development agents. The distinction should be made between economic space of a single firm and that of an industry, as in most cases relations within the latter will have an important though not necessarily deterministic influence upon the expansion of the former. In other words the economic space of an industry sets certain rules for all firms operating within this industry. Within oligopolistic market structure, a few big firms actually determine the degree of competitiveness, as well as influence the state of technology and rate of progress. In Chapter IV oligopolistic conditions will be examined based on the study of the international aluminum industry.

Objectives

This thesis has two main objectives :

- a. to relate the basic concepts of synchronized growth to the recent situation of Venezuelan development, largely in the context of the Guayana regional development program, and
- b. to document and evaluate the performance of selected Venezuelan regional actors in their role as 'potential' development agents, promoting synchronized growth.

The broadly outlined theoretical concepts should help to present the Venezuelan economic environment, reveal main problems of the country's regional development and show the Venezuelan progress towards synchronized growth, as well as introduce some key problems facing prospective aluminum producers. The more detailed empirical research into the field of the Venezuelan aluminum industry aims to illustrate if/and how the country's aluminum joint ventures have evolved as particular development agents and how they have contributed to the regional growth.

Though it is beyond the limits of this study to fully scrutinize a synchronized growth strategy, it is hoped that the thesis will contribute to further clarification and validation of important parts of this approach. Clearly, more case studies will have to be examined to assess how the proposed strategy may be used in different environments.

Methodology

Data Gathering and Questionnaires

All statistical information on Venezuela was obtained during field work in Venezuela in 1980. Most of this information was not officially published at that time and it was collected from various government agencies and private firms. Chapter VI is almost exclusively based on data gathered through a survey - questionnaire and interviews conducted by the author. All information was verified with official records whenever it was possible, and in those cases where unexplained differences occurred between data sets the mean values are quoted.

The main survey - questionnaire was designed to provide answers to questions raised by the theoretical part of the study. Thus the Venezuelan regional actors were approached in order to find out if they satisfy conditions defined for development agents. The questionnaire was divided into four main areas of interest : organization, technology, production and employment (see Appendix I). These areas correspond with theoretical concepts from Chapter II. For example the first part on organization attempts to collect information on promotion of cooperation and its perceived effectiveness between regional actors. The analysis of production, exports and employment aims at furnishing data on the changing scale and scope of the economic spaces of the development agents. As positive changes in economic spaces are affected by progress in technology, a section is devoted to

technology, to reveal to what extent development agents have contributed to the real transfer of technology, the creation of local science and technology capacities and to further expansion of economic spaces.

The survey - questionnaire was distributed to 56 potential respondents.

In most cases the top executives of the public agencies, private companies and joint ventures responded. They were selected to represent all the main regional actors in the development of Guayana (see Appendix II).

In the case of joint ventures the people surveyed represented all partners to the venture. In some cases up to 8 executives were interviewed from the same company. Six companies chose not to fill out the questionnaire. Fortunately they were companies of secondary importance to the study. In many cases additional interviews were required for validation and completion of various sections of the questionnaires or to seek more detailed information on a particular topic. Two more companies were eliminated as their response to the questionnaire was found to be incomplete or otherwise unacceptable. These companies generally avoided answers to the more important questions.

Much of the information gathered through the interviews was qualitative in nature, providing insight into the operations of the various institutions and leading to descriptive representation in this thesis.

Study Plan

A brief review of relevant ideas and trends in regional development theory is presented as an introduction to the thesis. The review focusses mainly on those elements which had an important influence upon formulation of the proposed development strategy. More substantial references to the existing literature are made in the following chapters.

Chapter II discusses the basic concepts of a synchronized growth strategy. An alternative approach does not mean an automatic rejection of all traditional theoretical concepts. Many of those concepts are still useful. It is argued that in many developing countries searching for significant regional development, a strategy of gradual change in the existing institutional structures and creation of new institutions or development agents is required to draw upon the benefits of cooperation with multi-national corporations (MNCs) and to provide direction of development along lines supported by the national interest. Development agents are most directly responsible for economic growth, organization of space and satisfaction of regional needs. They also play a central role in technology choice and transfer. Their contribution to regional development depends upon their ability to satisfy certain conditions and consequently to expand continuously their economic spaces. The role of joint ventures as 'potential' development agents is discussed. Joint ventures appear to have some advantages, over other forms of business organization, in meeting regional goals.

Chapter III explains problems of economic growth, government intervention and the persistence of spatial inequalities in Venezuela. It provides a general analysis of internal factors that affect investment decisions of actual and potential development agents. More attention is given to the manufacturing sector as manufacturing seems to offer more hope for accelerated growth of the national and regional economies. The existing spatial organization of the country is described. Venezuela represents almost a classic example of a 'center-periphery' spatial model. The self-adjusting forces which would eliminate spatial imbalances have not been very effective in the country.

Chapter IV examines Venezuelan progress towards synchronized growth. It is argued that the country has already benefited from introducing some policies which support this type of strategy. Venezuela has created new development agents and has initiated harmonization of interests and actions between national and regional actors on a limited scale. The role of the Guayana Development Agency is presented. The new 'development agent' for the periphery has been programmed largely within economic rather than strictly geographic spaces. The positive and negative aspects of the Development Agency for Guayana are weighed.

Chapter V introduces the international space of the aluminum industry which Venezuela has entered by establishing joint ventures with foreign partners and starting the production of aluminum in the Guayana region. A more detailed analysis of the aluminum industry is found necessary as new producers are subject to the rules established by MNCs. Their ultimate success depends on a complex understanding of relations within economic space

of the industry. The technology of aluminum smelting and the world's production and consumption of aluminum are examined. The aluminum industry is a truly international activity dominated by MNCs. The Venezuelan situation and the comparative advantage of its aluminum producers are discussed.

Chapter VI attempts to evaluate the performance of the Venezuelan aluminum joint ventures as development agents, promoting a synchronized growth strategy. The main reasons which have led to the creation of the joint ventures in the Guayana region and the main problems which hamper cooperation between partners to the ventures are examined. It is claimed that the aluminum joint ventures have generally succeeded in promoting regional growth, though their contribution to the transfer of technology is less impressive.

Regional Development Theory

A synchronized growth strategy is based on the rich tradition of regional development theory.

The emergence of regional development thinking is a relatively new phenomenon as it dates back to the late 1950s (see Brookfield, 1975), when the importance of space in development was finally reassessed. Siebert has claimed that

Growth theory formulated its models for a wonderland of no spatial dimension, and regional science did not bother to introduce the time dimension (Siebert, 1969, p. 6)

while

Economic activities take place not only in periods of time but also in a spatial setting, so that a model of regional growth must introduce not only the time dimension but also the concept of space (ibid., p. 11).

The main stream of regional theory for the past two decades has been influenced by works of a few main theorists such as A.Hirschman, F.Perroux, G.Myrdal, J.Friedmann, H.Richardson, as well as a number of other minor contributors. Some attempts have been made at a difficult task of trying to synthesize the state of regional growth theory with various degrees of success (see Friedmann, 1966 & 1972; Siebert, 1969; Richardson, 1973 & 1979; von Böventer, 1975; Hilhorst, 1971;and Stilwell, 1972). Richardson has classified the most popular regional growth theories into the following groups :

- a. export base
- b. neo-classical
- c. 'cumulative causation'
- d. econometric models
- e. input - output models
- f. multisectoral development planning models.

Such a classification may not be very convincing since Richardson admits himself that

it is indeed perhaps rather perverse to discuss regional econometric models under the label 'theory of regional growth'. Strictly speaking such models should be used to test alternative theories of growth and are not linked to any specific theory (Richardson, 1973, p.34).

Stilwell suggests a slightly different approach

It is convenient to group the various theories of regional growth as follows :

- (i) those that consider growth to arise as a result of resource reallocation;
- (ii) those relating growth to the expansion of the region's export base;
- (iii) those that concentrate upon investment in its relation with the growth of capacity; and
- (iv) those that consider growth as a cumulative process

(Stilwell, 1972, p. 30).

He further claims that each group calls for different regional policy measures. For example the first group requires movement of production factors to secondary and tertiary industries.

Regional theory has been influenced to a great extent by major concepts borrowed from development theory, which have been redefined in order to accommodate 'the element of space' and therefore to be able to offer a better explanation to the nature of regional growth.

Open and Closed Systems

Regions are in most theoretical studies treated as either closed or open systems (Friedmann, 1966; North, 1964; Hilhorst, 1971; Stöhr, 1975; Pedersen, 1975). In the former case growth evolves from 'inside the region' and therefore internal factors are analyzed, such as the necessity of specialization and diversification of regional production structure. Within a region important spatial sub-systems can develop, such as 'urban-rural' and 'inter-urban' / city to city / (see Stöhr, 1975). In an open system approach growth comes from 'outside the region' as a consequence of an increased demand for regional products from other regions. Recently more attention has been given to open systems as it is realised that closed systems do not exist in today's world (see Richardson, 1979).

In both approaches regions pass through different stages of development from traditional to modern (Rostow, 1961; Friedmann, 1966). Friedmann claims that regional problems are directly related to the development stage and that they change as a country moves from a pre-industrial to a post-industrial stage:

regional policy appears as a function of the spatial transformations engendered by economic growth ... Transitional

societies are clearly the most directly concerned with regional organization, partly because of the spatial shifts involved in moving from an agrarian to an industrial economy, partly because a large portion of their potential resources are still unutilized (Friedmann, 1966; p. 6 & 8).

Friedmann further suggests that each development stage is characterized by different spatial structures which progress from independent local centers with no hierarchy to a functionally interdependent system of cities typical for the phase of industrial maturation.

Two Models of Regional Growth

Most regional growth theories follow two main models:

- a. 'equilibrium model', which has been influenced by neo-classical tradition in development theory and which claims that the movement of production factors among the regions will eventually lead to the elimination of regional disparities and convergence of income differentials. Even Hirschman advocating 'unbalanced growth' believes that the 'trickling-down' effects would dominate over the 'polarization' effects as economic growth of the North had to depend on products from the South (Hirschman, 1960, p. 189). While Spencer & Thomas (1969) support the concept of regional convergence, Myrdal (1957 & 1968) and Friedmann (1966) are of opposite opinion. Friedmann gives several reasons for the failure of 'trickling-down' or 'spread' effects to win over 'polarization' or 'backwash' effects in a real world situation. They include the continuous growth of the developed areas without signs of

diminishing returns, relatively slower growth of demand for agricultural products from less developed regions, external economies and amenities at the center, investment perceptions and the resistance of South to socio-economic changes (Friedmann, 1966, pp. 14-18).

- b. 'disequilibrium model' which has been supported by Myrdal's concept of cumulative-circular causation, the center-periphery model (Prebisch, 1950; Meier & Baldwin, 1957), dependency theory and radical or neo-Marxist approaches (Cardoso, 1966; Furtado, 1965; Roberts, 1975; dos Santos, 1970, and Wallerstein, 1974). Disequilibrium model maintains that interregional growth is disequilibrating and because of 'polarization' or 'backwash' effects the regional disparities will widen rather than disappear. Therefore economic growth will tend to be concentrated in selected regions ('center') benefiting only few, while other regions will remain underdeveloped ('periphery') and will be subject to exploitation from the center. It is rapid industrialization that leads to increased investments in a central region and to creation of a typical 'center-periphery' or dual structure. (Friedmann, 1966). Within the national space the 'center' may include a single urban area or several cities or regions. Hirschman argues that:

in the geographical sense, growth is necessarily unbalanced. However while the regional setting reveals unbalanced growth at its most obvious, it perhaps does not show it at its best. In analyzing the process of unbalanced growth, we could always show that an advance at one point sets up pressures, tensions and compulsions toward growth at subsequent points (Hirschman, 1960, p. 184).

Averitt (1968) in his study employs the concept of 'dualism' in a structural sense. The 'center' system is composed of firms which are large in size and influence, while the 'periphery' has relatively small firms which are operated by an individual or a single family. The 'center' has an advantage over 'periphery' as it uses modern technology, business organization and marketing. In other words the viciousness of the 'center-periphery' or 'dual' structure lies in the superiority of one sector and the inferiority of the other. The co-existence of the two is almost non-existent and the expansion of the center is detrimental to the periphery (see Singer, 1970). Although Averitt's analysis has no spatial dimension in traditional sense, his concept helps to understand spatial concentration of economic activities in geographic centers and inadequate growth in the peripheries. The Italian example could be quoted

Although the total number of firms in the least-developed region (South) and the most-developed (North-West) was virtually equal (177,500) against (198,000) the only category of firm in which the South had more units than the North-West was those employing less than ten persons (Holland, 1976, p. 147).

Growth Pole / Growth Center Concept

The tendency of economic growth to be concentrated in certain regions forms the basis for growth pole/growth center theory which despite its inconsistency and controversy has become one of the most popular concepts used in regional planning. (Perroux, 1955 & 1964; Boudeville, 1966; Lasuen, 1969 & 1974; Moseley, 1974; Richardson, 1975, Steed, 1971).

Geographers found in the concept of growth pole a method for integrating economic growth theory with the theory of spatial organization. Yet this attempt has been less than successful (see Gauthier, 1974). The term ' growth pole ' has been more often replaced by that of ' growth center ', the distinction made by Darwent (1969), which is more convincing to many authors as it tends to focus on concrete geographic spaces and largely avoids all complicated problems of Perroux's economic spaces. Growth centers are then treated as expanding urban centers (Stöhr, 1972/1974), while Perroux's growth pole is more close to a dynamic sector in the economy, an industry or propulsive firm.

O'Connor mentions the following conditions which are essential for a growth center :

the growth center needs to be :

1. the location of a sectoral geographic cluster
2. of sufficient size to generate urbanization economies
3. the location of national industries with strong linkages with regional industries
4. the location of a concentration of regional industries
5. the location of national innovative industries

... to be successful, a growth center needs to satisfy all these conditions (O'Connor, 1974, p. 113).

Richardson (1975) in his study based on the Spanish experience, draws attention to the significance of two main conditions for growth centers : the number of designated centers must be kept small and spatial priorities

must be kept unchanged over long periods of time.

In communist countries the concept of industrial territorial complexes has been highly popularized. It largely translates into a particular geographic concentration of industries or another interpretation of growth center concept (Hansen, 1972 ; Bandman, 1980).

According to Hermansen

An industrial complex may be defined - in a very wide sense - as an ensemble of technologically and economically interconnected industrial units usually located on a given territory. Such a complex is normally a planned one, based on common physical infrastructure and developed around one major industry that forms the core or the focal point of the complex (Hermansen, 1972, pp. 171-172).

The lack of immediate success in solving all complicated problems of regional development, different interpretations and misinterpretations of original concepts, as well as a flood of literature on the subject that could not be tested in real life, have encouraged many authors to offer severe criticism of a growth pole / growth center theory. However, the criticism will probably cause more confusion as it is almost as inconcise as the theory itself.

In most cases one is not sure what concepts are subject to criticism, is it Perroux's growth poles (see Moseley, 1974) or its interpretation such as Paelinck - Hansen's discussions (Holland, 1976), sectoral and spatial polarisation (Buttler, 1975) or finally growth centers and their application in regional planning (Friedmann & Douglas, 1975 ; Friedmann & Weaver, 1977; Hansen, 1972 & 1975 ; Holland, 1976 ; Gilbert and Goodman, 1976).

The fact is that many authors misinterpret Perroux's original ideas. For example Holland argues that

growth pole policy not only limit the feasible effectiveness of regional policy through neglect of the possibility of a more dispersed location of plant, but also may fail to promote self-generating growth in the wider area of the region concerned through excessive concentration on purely locational factors, and insufficient attention to the intrasectoral and intersectoral structure of production and competition at both the regional and national level (Holland, 1976, p. 53).

Corragio (1972) has argued that applying the growth center concept promoted the practice of unequal capital accumulation and served as a tool for spatial domination, far from being an instrument for equalization. Friedmann concludes that

in summary, growth center doctrine is quite useless as a tool of regional development. It is even questionable whether historical accounts of capitalist development are best approached through growth center hypothesis (Friedmann, 1977, p. 321).

Katzman supports this argument and claims that the French school does not explain the 'industrialization - urbanization processes' whether in developed or developing countries. He notes

São Paulo has not grown according to the norms of the French school. At least until 1940 agglomeration was not explicable by industry mix effects because the national industrial structure had been stable for decades and because São Paulo was largely engaged in traditional food processing and textile manufacture (Katzman, 1977, p. 128).

On the other hand Richardson defends the growth center doctrine by claiming that the increasing disillusion with the regional policies based on the concept is the effect of

over-ambitious expectations, short run horizons, lack of political stamina, deficient investment criteria, poor locational choices and unimaginative policy instruments... an alternative interpretation is that it is precisely because natural polarization tendencies are so strong in Latin America that growth poles are needed. The only viable means of challenging the existing polarization towards the primate cities is to promote polarization elsewhere, perhaps in one or two counter-magnets or large 'equilibrium metropolises' (Richardson & Richardson, 1975, p. 178).

New Trends in Regional Development Theory

While there is a general dissatisfaction with the state of regional development theory, there is also not much offered in return that could realistically replace the traditional concepts and which would have the characteristics of a more general theory. (see von Böventer, 1975).

Johnson's concept of a 'complete spatial system' or urban centers which form a hierarchy from agro-urban towns through several intermediate types to the capital city represents another kind of rather narrow structuralist's approach and probably could play certain role in some but not all developing countries (Johnson, 1970).

Logan suggests that

probably the greatest need in regional planning in developing countries is temporarily to divert attention away from spatial structure to a systematic study of these organizational systems that bind together people and economic activities (Logan, 1972, p. 244).

Other regional theorists disagree as they continue to assign the crucial role in development to spatial organization and urban systems (Stöhr, 1975, Richardson, 1973 & 1979; von Böventer, 1975). Stöhr supports the concept of diffusion of development impulses through the urban hierarchy (see also Berry, 1972; Friedmann, 1970; Pederson, 1975) and claims that regional disparities could be eliminated by changing the urban systems. Both Richardson and von Böventer give more attention to 'self-supporting' urbanization and agglomeration economies which play an important role in generating regional growth.

Another approach has been presented by Clark (1973) who has insisted on maintaining the stability of ecosystems which has been endangered by man's activities, but there is little hope that his voice will be heard especially in developing countries which continue to struggle with low incomes, high rates of unemployment and insufficient economic growth.

In recent years a separate group of new regional development strategies has emerged which is based upon the concept of 'basic needs' (Friedmann & Weaver, 1977; Higgins, 1977; Abonyi, 1979, Streeten, 1979). Abonyi distinguishes agropolitan development, self reliance, another development and eco-development as new approaches which offer new solutions to regional problems though there are 'certain basic similarities' between them.

These include a focus on rural or integrated regional development, the movement of industrial production facilities to rural regions, emphasis on specific projects with identifiable 'target populations', the 'tailoring' of development projects to meet local needs, the concepts of 'bottom up' development and participation, and an emphasis on reducing dependence on the developed world (Abonyi, 1979, p. 16).

It is probably too early to assess fully the validity of those new approaches, since there are still too many questions left unanswered by the authors of those concepts. At the same time it seems that the application of the new strategies in a real life context could be very limited. For example Friedmann's basic needs or essentially agropolitan strategy is directed mainly at

densely populated, agrarian societies, characterized by low profiles of social development, high rates of population increase, incipient urban-based industrialization, high external dependency and rising indices of inequality (Friedmann & Weaver, 1977, p. 355).

Such societies are to be found in Asia and parts of Africa. In other words it is not again, at least now, a uniform regional development strategy which could be used by the majority of the Third World countries. (see also Higgins & Abonyi, 1977).

Another group of problems is related to very difficult and somewhat unrealistic conditions which are essential for the implementation of a 'basic needs' strategy. These are as follows

- selective territorial closure (which) refers to a policy of enlightened self-reliance at all relevant levels of territorial integration: district, region, and nation. It flies straight in the face of the ideology of free trade and comparative advantage as well as the attempts of transnational enterprise to organize a functionally integrated world economy under its tutelage...
- the communalization of productive wealth... (which) means that the power to determine the ultimate uses and disposition of land and water rests with the appropriate territorial community...

- the equalization of access to the use of social power... Social power is multi-faceted. It includes: productive wealth in land, water and tools; information and knowledge; education...; financial resources (and) contact networks. (Friedmann & Weaver, 1977, pp. 357-359).

It seems very unlikely that such conditions could be met by any developing country either today or in the nearest future.

The agropolitan development would change spatial organization of a country by establishing 'cities-in-the-fields' in densely populated rural areas. Friedmann further suggests creation of 'agropolitan districts', which would have a population density of minimum 200 per km². They would be treated as autonomous, 'self-governing' units which are responsible for their own development (Friedmann & Douglas, 1978, pp. 183-185).

Role of Geography

The contribution of geographers in the field of regional development theory has been significant. Most scholars have continued to focus their attention upon the spatial aspects of development processes, as much progress has been made in developing such concepts as 'diffusion processes' (Hägerstrand, 1967; Berry, 1972), though recently challenged by Souza & Porter (1974) and Brookfield (1975), 'urban systems' and 'urban hierarchy' (Berry, 1961 & 1971; Stöhr, 1975), 'corridor development' (Pottier, 1963; Whebel, 1969); also empirical studies have been undertaken to measure 'trickling down' and 'polarization' effects (Moseley, 1972; Lamb, 1975).

The separate and important position has been assured by the so called 'geography of modernization' (Soja 1968 & 1974; Gould, 1970). According to Soja the essence of 'modernization' is a psychological, social, cultural, economic and political change

the modernizing society is viewed as comprising an emerging spatial system, a geographical community functionally organized to promote the interrelated processes of change (Soja, 1968, p. 1-3).

In Soja's case study from Kenya, the modernization processes are believed to be a function of:

1. adequate transport and communication networks
2. increased levels of urbanization and spatial integration of the country
3. popularization of the market principle
4. socio-cultural changes; detribalization and education
5. cooperation with other centers of modernization (Soja, 1968).

In a criticism of 'modernization' approach Singer (1971) points to the fact that this 'traditional-modern' paradigm does not give an adequate explanation of the mixture of 'tradition' and 'modernization' which co-exist in many developing countries. Also de Souza and Porter claim that though

the modernization surface describes elements of modernization as spreading outward from centers in diffusion waves and through urban hierarchies, it does not help to explain how and why this occurs (de Souza & Porter, 1974, p. 79).

One of the main problems which geography faces today, if it wants to contribute more to the field of regional development, is its continuing assumption of 'fixed and given institutional frameworks' which

follows the tradition of the positivist approach (see King, 1976). King insists that geographers should redirect their attention to the real world rather than stick to 'abstract competitive settings' where mostly actions by private sector are analysed. One possible solution is the adaptation of a new methodological approach or a 'middle course':

a new type of social science, one that is not based on the physical sciences paradigm, that considers values along with facts, and that allows for applied social science to contribute to the development of policy paradigms (King, 1976, p. 306).

Guelke has recently suggested the adoption of a Collingwoodian or idealist approach which would be based on rethinking past actors 'rational thoughts'. In that sense geography would become a study of thought in a temporal and spatial context (Guelke, 1977). This new alternative has been criticised by Watts and Watts who argue that then

geography would lose its separate identity and emerge utterly transformed, as a minor subdivision of philosophy (Watts & Watts, 1978, p. 128).

Despite some criticism and confusion (see Brookfield, 1975), the role of geography in regional development should be regarded as positive and valid. Hoyle has summarized the role of geography as:

a provider of information necessary for development and in an essential dimension; as a field offering a range of useful techniques some tried and tested, others experimental; and as a discipline open to collaboration with other disciplines, whilst preserving its own viewpoint. In these respects geography provides an important and worthwhile contribution towards that wider and deeper understanding of development problems which may in the long run contribute positively towards the overall improvement of living conditions in the countries of the less developed world (Hoyle, 1974, p. 20).

Conclusion

A synchronized growth strategy, which will be explained in the following chapter, is seen as a somewhat different approach to regional development theory and as such it draws upon different, often competing concepts and ideas. It favours 'open systems' over 'closed regions' and emphasizes the concepts of 'development agent' and 'economic space'. Development agents operate within particular economic spaces which for most major agents include more than a single region.

The strategy accepts 'unbalanced growth' but its aim is to gradually reduce negative regional and sectoral imbalances. At the same time it is recognized that imbalances often have positive effects upon accelerated growth.

The center-periphery and dependency models are found useful in regional analysis but they seem to attach too much attention to external factors, beyond the control of a given country, while neglecting internal factors which in many cases may be equally if not more important for regional development (see Chapter III).

While it is believed that more growth centers are necessary for stimulating development processes in backward regions, the main attention in this study will be given to development agents rather than growth centers.

Development agents act as 'propulsive forces' within economic spaces.

The new trends in regional development theory, such as 'basic needs' approach offer possible alternatives in development strategies but their

application may be restricted only to specific areas in very poor countries and remains controversial for more advanced developing countries.

A synchronized growth approach seeks 'compromise solutions' to regional problems through cooperation of all interested development actors. It emphasizes the role of the institutional framework, a point which many geographic and economic studies have tended to neglect.

It is hoped that this thesis will succeed in satisfying at least some of the objectives noted earlier by Hoyle and that it will support further search for new concepts and methodologies in social sciences.

All scientific understanding is, above all, an effort to simplify by unifying what has long appeared as unrelated and disparate (K.W.Kapp, as quoted by Steppacher, 1977).

CHAPTER II

A STRATEGY OF SYNCHRONIZED REGIONAL GROWTH

Introduction to A Synchronized Growth Strategy

The concept of synchronized growth could be traced back to early works by F.Perroux. It is not a revolutionary approach, but rather one which could be classified as a 'middle-ground' between the extreme positions of conservatives supporting status quo and radicals calling for revolution. It accepts the reality of developing countries and it promotes gradual changes in the system. A strategy of synchronized growth is perceived basically as a regional strategy though it could be also presented as a national one.

Development Goals and Synchronization Processes

The starting point for our strategy is the definition of regional development goals, which should be revised continuously in order to better satisfy all human needs, both social and individual. Social needs are those for which society assumes a certain responsibility, while individual needs remain each person's own concern (Friedmann & Weaver, 1977, p. 352).

More than ten years ago Perroux stressed that man played the

most important role in any socio-economic system, and respectively in growth and development, therefore progress had to respect man, his needs and ambitions (Perroux, 1964). For Perroux the main goals were: an increase in production, reduction of production costs, an appropriate distribution of incomes, satisfaction of the basic needs of man, his desires and creation of new opportunities for people. In that sense Perroux's concept of growth was more close to our understanding of development.

Seers insists on making a distinction between development and economic growth

development means creating the conditions for the realization of human personality. Its evaluation must therefore take into account three linked economic criteria: whether there has been a reduction in (i) poverty, (ii) unemployment, (iii) inequality (Seers, 1972, p. 21).

It is interesting to notice that 'basic needs' do not differ much from generally accepted development goals, as they include: adequate food, clothing and shelter, education and health, employment opportunities and basic human rights. The 'basic needs' approach holds that

development should develop Man, not things. That is development is not the increase in GNP per capita, nor of world trade, nor of the introduction of democracy or socialism as such. Development theory and practice should instead be rooted in a theory of human needs that would lead directly to an increase in the QOL (quality of life) of the majority of the population (Abonyi, 1979, p. 18).

Some other authors have tried to define more specific development goals (see Goulet, 1971). De Souza's and Porter's list include

1. a healthful, balanced diet in all seasons;
2. adequate medical care throughout life, with special attention to the early years of life;
3. environmental sanitation and control of disease;
4. labor opportunities of sufficient variety to harness the varied

- talents of individuals;
5. adequate opportunities for learning useful skills and for developing the mind;
 6. safety of person, freedom of conscience, including religious belief, and freedom from anxiety about possessions and the future well-being of one's children and their descendants;
 7. adequate housing;
 8. systems of economic production which are in balance with the environment, and
 9. a social and political milieu wherein people enjoy equality, and where differentiation according to class, wealth, sex, color and religion is absent, or at least not degrading (de Souza & Porter, 1974, pp. 3-4).

Such a list of development goals is very appealing and it seems appropriate for almost any country. It also suggests that countries are less or more developed according to the degree to which they have managed to satisfy those objectives.

Though de Souza and Porter have tried to avoid economic terminology and have neglected all traditional economic objectives in development, it seems obvious that the achievement of the majority of their goals is not possible without more economic growth. Also followers of the 'basic needs' concept overlook the fact that it is more efficient use of the country's human and natural resources that is needed to satisfy human needs. Their opposition to more economic growth is therefore unfounded.

A few years ago Kuklinski has stated that economic growth is necessary as 'the engine of progress and social change' and even concern for better environment requires more economic growth (Kuklinski, 1972/74). This argument has been supported by Singer who has argued that in developing countries

where the vast majority of the population lives at or below subsistence level, there are few rich, and fewer still very rich. Complete equality would mean a nation of people, all of them living close to subsistence level, and with little hope for independent development. Growth is absolutely necessary but the growth should emerge from development rather than expecting development to emerge from growth (Singer, 1977 in Higgins & Abonyi, 1977, p. 6).

Economic growth plays a central role in our strategy.

Synchronized growth is not an ultimate goal to be reached at some point in time; it is a development strategy which through improved forms of cooperation stimulates regional growth and leads to more optimal use of the country's natural and human resources, therefore assuring better satisfaction of social and individual needs. The most essential part of the strategy is a continuous coordination or harmonization of interests and actions of all partners in regional development, such as private and public capital, social groups, institutions and individuals. Such actions should be preceded by a 'democratic' dialogue between all interested participants. The importance of strong cooperation and dialogue between different actors in regional development has been noted by Perroux (1964), and reaffirmed by advocates of the 'basic needs' approach (Higgins & Abonyi, 1977, p. 21).

Synchronization processes, which are designed to promote higher or more sophisticated forms of cooperation and harmonization, should be initiated at all possible levels, and in the case of more complex organism such as public administration, coordination of actions within the government itself is as important as cooperation with outsiders. It should help to eliminate contradictory policies, government regulations and actions. This will require that all so called 'regional programmes' be discussed first and attempts be made to harmonize all concerned government agencies including most ministries and

not just one planning unit. It is true as has been stated by Gross that

the administrative processes of planning, activating (or in older terminology directing) and evaluating are interwoven at all hierarchical levels (Gross, 1977, p. 184).

A synchronized growth strategy assumes that there has to be a certain amount of 'good will' on the part of all the partners in regional development to enable harmonization of different interests and actions. However one could argue that in most cases 'good will' and voluntary cooperation have not been so far present in real life. Lack of mutual understanding and collaboration can be blamed on ineffective institutions that support the status quo.

The proposed strategy calls for a new institutional framework which would promote direct forms of cooperation between partners in regional development. It is believed that the existing institutional structure should be changed gradually, as new institutional forms have to be not only created but also tested in a real life context, which may require more than narrow political or economic motivations. For example nationalisation of a given industry and creation of public enterprises, though they serve some political objectives, may also seriously slow down development processes for which the whole nation may have to pay a very high price. Instead other forms of business organization may prove to be more advantageous for the country and serve both economic and political aspirations of the people.

Unlike 'dependency theory', a synchronized growth strategy focuses upon internal factors which hamper regional development. More than that it suggests that even 'dependency' relations could be changed by local

initiative from the 'periphery' rather than waiting for the 'center' to make a first step.

The new strategy should help to answer two basic questions for regional development: what to produce at the regional level, which actually explains also geographic locations of economic activities; and how to produce, in the sense of the most appropriate business organization or institutional form. In the past those decisions have been usually made by individual investors, mostly private, both local and foreign and have not always served the interests of all regions.

Synchronized Growth and Comparative Advantage

Support for a synchronized growth strategy does not need to involve an inconsiderate rejection of all traditional concepts as well as economic and geographical reasoning. It is believed that any new development strategy does not have to be necessarily a reversal of all previous policies and actions and rejection of the whole of development theory.

It is suggested that all new ideas and concepts have to be elaborated carefully and that parts of the so called 'orthodox theory' could be still found very useful if redefined and placed within a new context of regional development goals. For example contrary to the 'basic needs' approach, it is most likely that international trade will increase rather than decrease in its influence upon regional growth. It is still true as has been claimed by Sachs that

the worse the prospects for the foreign trade of a given country, the more urgently it needs - even though it suffers from the lack of foreign exchange - to import large amounts of machinery and equipment in order to create a basic industry of its own (Sachs, 1965, p. 5).

The experience of many developing countries support this argument, even in cases when governments are devoted to 'self-reliance' policies. It is also well known that those countries need new markets for their own products, as their local demand is rather limited. Uri maintains that

it is essential that the developing countries increase their exports of industrial products. At the beginning of the 1970s, it was estimated that they could not achieve a 6 percent annual rate of growth unless they managed to increase their exports by 8 percent. Since one could only count on a 5 percent annual increase in the sale of primary products, the gap could only be filled if their exports of industrial products grew by 15 percent each year (Uri, 1976, pp. 120-123, see also Williamson, 1978).

Another reason for an increased role of foreign trade is the necessity to reverse unfavorable effects of previous policies and consumption patterns which have promoted industries which should have not been fostered because of their high costs of production and low contribution to regional development.

The basic question remains of choosing proper industries for a given country or region and here the concept of comparative advantage if modified, could be still very useful for our regional strategy. As the distribution of natural and human resources are not equal throughout the country and among nations, regional production functions should be based on specific factor mixes which exist in different areas. In that sense international trade theory could be also viewed as a theory of international location (see

Vernon, 1974).

Katzman has noted how some problems of regional programs in Brazil were caused by a neglect of comparative advantage

with no prior analysis of the region's potential comparative advantage SPVEA (Superintendency of the Plan to Valorize the Economy of Amazonia) had no rigorous criteria for choosing among investment projects (Katzman, 1977, p. 75).

The greatest weakness of the comparative advantage concept lies in its static character and the assumption of perfect competition. The 'orthodox' trade theory assumes immobility of the factors of production between countries. There is also a difference between the classical model by Ricardo which allows for variations in production functions and the neoclassical interpretation by Heckscher and Ohlin where production functions are assumed to be the same for all nations. In the neoclassical model of Heckscher-Ohlin-Samuelson international trade is determined by initial differences in factor endowments. This is an unrealistic assumption as in today's world some factors such as capital, know-how, technology and, in many cases, labor, are mobile, leading to changing endowments, and, consequently shifts of comparative advantage from one region or country to another. The mobility of capital and technology is often due to the operations of MNCs (see Corden, 1974; Dunning, 1974).

Boatler suggests that today a number of less developed countries no longer have a comparative advantage in labor-intensive industries

the comparative advantage of some of the more advanced less developed countries has shifted, perhaps without the countries themselves being fully aware of it, toward export goods, not unlike those exported by the US (Boatler, 1978, p. 59; see also Chenery, 1961).

For a successful development strategy it is more important then to find what one may call 'dynamic' or 'modified' comparative advantage

in a long and medium run, rather than establish new industries upon the existing situation at a given point in time. More than that most less developed countries have to 'promote and build' their comparative advantages in order to fully profit from development processes. In determining comparative advantage of a region we have to analyse more precisely changes in factor endowments and trends in factor prices. Scitovsky suggests that

a country can best learn its comparative advantage by having a price mechanism designed to search out that comparative advantage, and by taking investment decisions in the light of it (Little, Scitovsky & Scott, 1970, p. 359).

However such a price mechanism does not exist in developing countries, and even in more advanced countries it is distorted by government intervention, actions by multi-nationals and trade unions.

Some help for our analysis could be found within the product cycle theory, as defined by Posner-Vernon-Hirsch, though Vernon has rejected the traditional concept of comparative advantage. The product cycle suggests that there are shifts in comparative advantage of predictable direction on international scale. All products can be classified into three main categories: Ricardo goods, Heckscher-Ohlin goods and new product cycle goods (Hirsch, 1974). As a product matures the developing countries gain comparative advantage in production processes with more standardized technology, while advanced countries lead in the production of new products and processes.

The product cycle theory has also serious limitations. First of all the classification of products according to their life cycle is

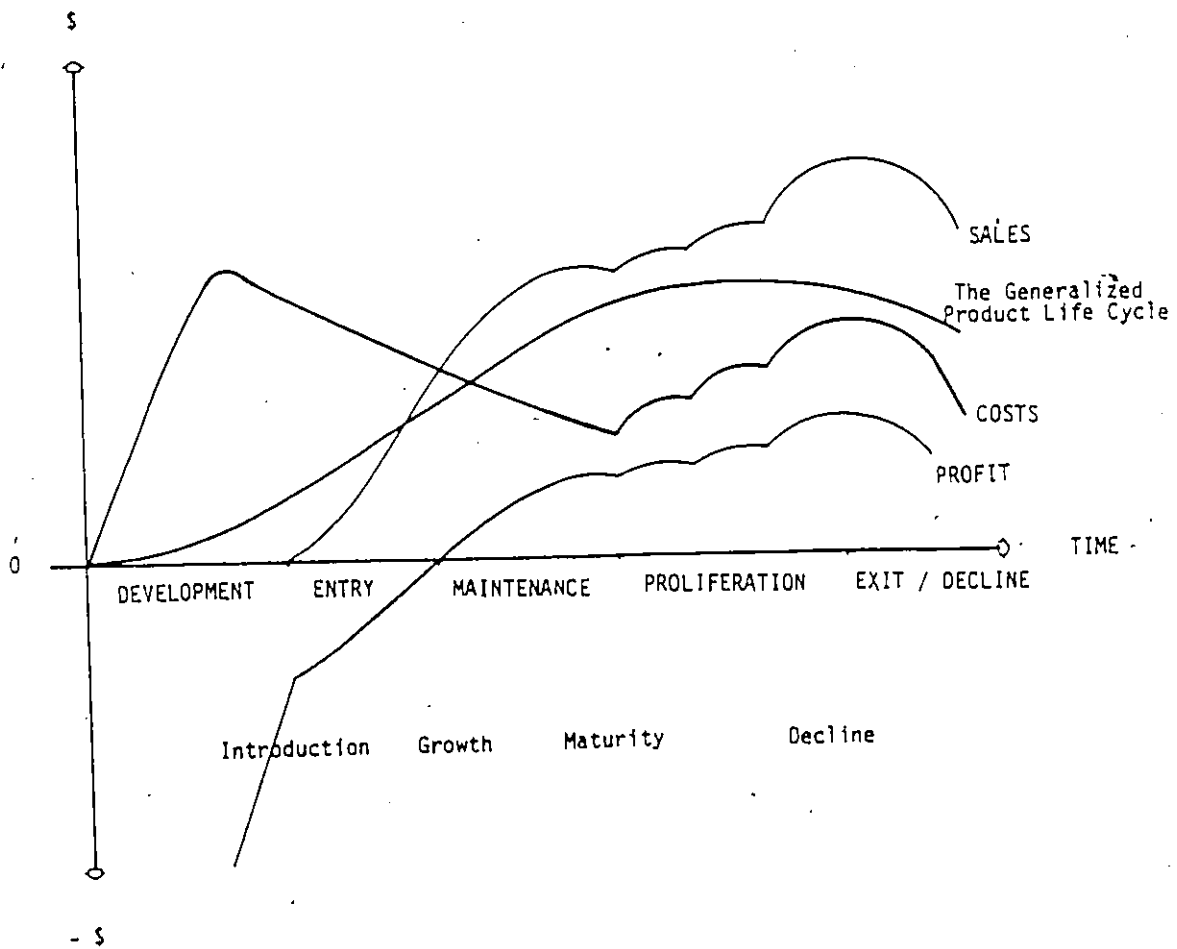
almost impossible (see Morall, 1972). What is even more important is the fact that while the theory may claim some success in explaining existing and past trends in trade patterns of different commodities and international locational patterns, it cannot create a basis for future development strategies, as it would tend to strengthen the superiority of advanced countries and regions with peripheral regions concentrating on production of mainly mature products and therefore always being condemned to following the development path established by industrialized nations. More recent developments have proven that developing countries are capable of introducing new products and applying new experimental technology, such as for example pulp and paper industry in some tropical regions, including Brazil.

On the other hand the redefined concept of product life cycle may be found useful in estimating future demand or sales, costs and profits (see Figure 1), as well as marketing decisions, corporate planning and control (Enis, La Garce and Prell, 1977).

Regional comparative advantage can be determined only after detailed study of factor endowments has been accomplished. It is no longer valid to state that a given region has a comparative advantage in labor- or capital-intensive products as the exact characteristics and trends in all factors of production are required. These may include information on

- a. labor; unskilled and skilled labor, technical training, educational levels, work attitudes, number of scientists and engineers,
- b. availability of capital; domestic and foreign financing, costs of public and private capital,

Figure 1 : The Product Life Cycle Concept Restructured



Source : Enis, la Garce & Prell, 1977, pp. 47 - 51 .

- c. access to technology; local and foreign, technological potential of the region, number of R & D centers, .
- d. natural resources and their spatial distribution; possible inputs of local materials, exploitation costs, basic infrastructure, costs of imports and transportation.

On the other hand the neglect of comparative advantage and concentration on policies such as import substitution can lead to an economic structure unsuited to export markets which may significantly hamper economic growth and regional development once a country 'runs out of import substitution' (see Little, Scitovsky and Scott, 1970).

Development Agents in Synchronized Growth

The proposed synchronized growth strategy ascribes major importance to the transformation of institutional structures. It is believed that institutions not only promote regional development but may also resist it. Therefore successful development involving a breakthrough of vicious circles depends upon the ability to transform unfavorable institutional frameworks by introducing and testing new organisational forms, which will be called here development agents.

A development agent does not have to be necessarily a private economic unit; it could be a public agency, mixed public - private venture, or perhaps a social organization. It should contribute more to the achievement of pre-defined regional development goals than the existing institutions. This may occur through technological and/or organizational superiority of a new development agent.

It is recognized that the achievement of regional objectives requires more economic growth and for that reason also more development agents directly involved in industrial production are needed. Development agents are seen as essentially 'dynamic' institutions which are capable of growing preferably at accelerated rates.

A strategy of synchronized growth gives priority to development agents in the manufacturing sector, recognizing that manufacturing is the main generator of direct and indirect employment and incomes. There is some support for this hypothesis from the empirical work. Brown has made a distinction between manufacturing as 'basic' industry and the rest as

'non-basic' and argued that:

movement of manufacturing jobs into a region will eventually create 80 percent more jobs in local non-basic employment... the converse is not true to any great extent; the creation of new non-basic employment in local services will not by itself induce or pull 100 manufacturing jobs into a region (Brown, 1972, p. 277; see also Holland, 1976, p. 128).

The growth of manufacturing industries is even more important in developing countries

industrialization is not an alternative to a rural golden age in underdeveloped countries, but an essential ingredient in the raising of living standards for the majority of people in the world from their present unacceptably low and often deteriorating standards (Sutcliffe, 1971, p. 319).

Uri adds that in those countries only the manufacturing sector and induced services can absorb large quantities of labor (Uri, 1976).

On the other hand it has been claimed by some authors that in less developed countries industrialization has been overencouraged in relation to agriculture (Little, Scitovsky and Scott, 1970). However it seems more appropriate to state that wrong type of industrialization based mainly on import substitution policies has been overencouraged, recognizing also the fact that industrial expansion should not be made at the expense of agriculture.

Role of MNCs in Regional Development

Traditionally the main contributors to the industrial growth of most regions in developing countries have been private companies,

both local and foreign owned. The increased government involvement in development processes has brought in public enterprise which has been motivated more often by political rather than economic reasons.

While the performance of all regional actors has been in many cases less than satisfactory, it has been mainly subsidiaries of MNCs which have been subject to severe criticism from the host countries, as well as on the part of many scholars.

Sunkel (1973) has argued that the world economy is in fact being reorganized into a new international system, structured around the MNCs, strongly supported by the advanced countries and their allies in less developed world. While such a statement is a serious simplification if not a distortion of the real situation, it is true on the other hand that generally MNCs tend to decrease the effectiveness of regional policies introduced by host governments. Their disintegrating effects upon regional economies could be felt not only by developing countries but also by industrialized nations.

MNCs may use 'transfer-pricing' which enables them to escape national control and payment of high taxes in a particular country.

According to Wionczek's definition

transfer-pricing involves fixing artificially above the international level the prices of goods and services (including technology) imported from headquarters by the foreign branches and affiliates of multinationals. Reverse transfer-pricing, on the other hand, involves fixing unilaterally below the international level the prices of goods exported by the same branches and affiliates in the LDCs to the headquarters and the third markets (Wionczek, 1975, p. 19):

The extent and nature of these practices are difficult to trace.

Streeten estimates that

one quarter to one third of world trade in manufactures and possibly more) is intra-firm trade... The chief considerations relevant to the pricing of intra-firm transactions will be taxation (including allowances and loss offset provisions), tariffs, exchange rates (expected changes, multiple rates, restrictions on remissions) political and social pressures (trade unions, fear of potential competitions) and joint ventures with local share holders. The phenomenon goes much deeper than 'fiddling' prices to evade tax payments (Streeten, 1974, p. 264).

However it has not been proven that all MNCs use 'transfer-pricing' policies which may turn against their own interests. 'Transfer-pricing' may lead to conflict with local authorities, as well as distort the corporate control mechanism (see Dymsha, 1972 and Section 482 of the Internal Revenue Code, 1968).

In the case of developing countries the presence of MNCs is often identified with 'exploitation' and 'dependency' (Brookfield, 1975; Hirschman, 1977; Holland, 1976; Friedmann, 1977). Gross has claimed that

multinational corporations, although powerful engines of growth, tend to accentuate rather than reduce inequalities in the distribution of income and wealth in developing countries. They concentrate on high-technology, capital-intensive techniques that tend to diminish, rather than increase, employment opportunities. In extractive industries they usually exploit natural resources for export to world markets rather than as a contribution to development in the host country. In manufacturing, they cater to demand trends in high-income countries, by introducing in developing countries patterns of consumption not conducive to healthy and sustained development (Gross, 1977, pp. 193-194).

MNCs are further accused of interference in local politics (Gianaris,

1978; Goodsell, 1975 and Wionczek, 1975).

Despite criticisms directed at MNCs there is no real evidence that locally owned companies contribute more to regional development than subsidiaries of MNCs. Ashcroft and Ingham have argued that MNCs are able to use regional resources more efficiently than local enterprises by introducing changes to production technology, structural reorganization and/or better location decisions (Ashcroft & Ingham, 1979, p. 36). Frank has suggested that 'undesirable consumption patterns' are promoted by uneven distribution of incomes in less developed countries rather than by operations of MNCs (Frank, 1980, p. 73).

The MNCs have managed to expand their operations because their investments supply capital, technology and skills as well as guaranteed marketing which are all scarce factors in most developing nations. Bennett has pointed out that in Latin America

IBM has been the major exporter of nontraditional goods from Argentina (\$14 million are expected to be exported in 1973) and Brazil (\$20 million in 1973) for several years, and thus it has contributed significantly to the balance of trade of both countries. In addition every manufacturing plant relies on local subcontractors for parts that initially must be imported from other IBM plants. These subcontractors are progressively brought up to the high quality standards embodied in the company's technology (Bennett, 1975, p. 230).

Williamson has found in his study that increases in GDP in Latin American countries in 1960 - 74 were significantly related to foreign investments (Williamson, 1978, p. 418).

Even in Western Europe, though there is growing opposition to more American investments, yet:

there is ambivalence, because on the whole American firms are performing well in Europe, helping to speed modernisation and to improve its productivity. Ford of England is the country's largest single exporter and Chrysler-owned Simca of France exports more cars to the rest of Europe than Renault, Peugeot and Citroen combined (Stevens, 1971, p. 53, see also Table 1).

It is true that today any country has the power to nationalize and exclude foreign firms from operations within its national economy but

few nations can afford to exercise their sovereign powers in such a manner (Tindall, 1975, pp. 189-190).

More studies should be undertaken to determine how high a price the countries pay for their 'divestment policies' advocated by Hirschmann (1969), which are more often a result of political pressure rather than economic reality. Divestment policies may also have serious negative effects upon regional economies. Behrman has argued that

divestment will not necessarily produce either transformation or development - other than symptomatically and may even lessen both, since it might pass economic power to less energetic and enterprising groups (Behrman, 1972, p. 487).

A synchronized growth strategy suggests that if the conflict of interests between MNCs and regions occurs, it is because of differences in the economic spaces within which transnational corporations operate. The corporate strategy reflects the global interests of MNCs and may run counter to the development goals of a given region. Henry has noted that

the total programme of the firm is managed on the principle of maximization of investment, productive resources and profits of the international firm... The role of the particular subsidiary may have little to do with the long run fortunes of the subsidiary, and the economy in which it is operating (Henry, 1973, p. 3, see also Steed, 1971).

TABLE 1 Indicators of Foreign Participation in Industries of Selected Host Countries

	Estimated Percentage of Foreign Share of:						Year
	Chemicals	Rubber	Iron & Steel Industry	Non-electrical Machinery	Electrical Machinery	Motor Vehicles	
<u>Developed Countries</u>							
Australia	84 (A)	-	72 (A)	-	-	83 (A)	1972/73
Austria	-	-	-	-	40 (E)	-	1973
Belgium-Luxembourg	21 (E) ^a	56 (E) ^a	-	32 (E) ^a	-	-	1970
Canada	73 (O)	70 (O)	-	-	64 (A)	84 (A)	1973
France	33 (E)	25 (E)	11 (E)	37 (A)	-	21 (A)	1973
West Germany	33 (A)	48 (A)	-	-	51 (A)	-	1974
Japan	-	-	-	-	50 (O)	84 (O)	1973
Turkey	54 (A)	59 (A)	-	43 (A)	-	38 (A)	1974
<u>Developing Countries</u>							
Argentina	37 (O)	75 (O)	-	82 (O)	33 (O)	84 (O)	1969
Brazil	51 (O)	44 (O)	61 (O) ^b	55 (A) ^b	33 (A)	100 (A)	1976
India	27 (O)	52 (O)	41 (O)	25 (O)	-	10 (O)	1973
Mexico	67 (O)	84 (O)	37 (O)	31 (O)	63 (O)	-	1973
Peru	67 (S)	88 (S)	-	25 (S)	62 (S)	-	1969
South Korea	22 (E)	-	37 (O)	19 (O)	-	-	1970

Employment in U.S. majority-owned affiliates

Based on the 5,113 largest non-financial enterprises

= Output; A = Assets; S = Sales; E = Employment; R = Revenue.

Source: Fayerweather, 1978, p. 41 and United Nations, Centre on Transnational Corporations, Transnational Corporations in World Development Re-examined, 1978.

The conflict of interests between foreign firms and local aspirations could be eliminated through synchronization processes which should result in new forms of cooperation among partners in regional development. The essence of synchronized growth strategy is a continuous search for and evolution of organizational forms of development agents which would contribute more to the changing goals of regional development, and/or would best respond to emerging market situation.

In that respect the MNCs' success could be looked upon as an optimal response of business organization to market conditions prevailing in advanced and certain developing countries. The emergence of MNCs is the effect of both market mechanism and market imperfections caused by government interventions and MNCs themselves.

However the future of MNCs may not be as bright as it was a few years ago. Sunkel has suggested that

the era of 'creating favorable business conditions for direct foreign investment' as a general policy seems to be coming to an end. But even then, as is seen more and more with the socialist countries, possible cooperation with foreign firms is not totally excluded, even though there will certainly be little place for wholly owned subsidiaries of foreign firms or private investment of the traditional kind (Sunkel, 1979, p. 224).

It seems that MNCs will have to change their own attitudes and strategies if they want to survive in a more difficult world environment. They should become more aware of regional needs and be more open to cooperation with local partners.

Curzon has noted that

Yet even Brazil is beginning to revise some of its very liberal regulations, probably in order to take account of public opinion which is not favourable to foreign multinationals. The great majority of developing countries have introduced legislation or rules which limit foreign investments to joint ventures (Curzon et al., 1977, p. 119; see also La Palombra & Blank, 1979, pp. 103-122).

Today the increased political pressure and changing economic conditions in many countries and especially in Latin America, call for new forms of industrial cooperation which have to satisfy two basic conditions: political acceptance, based mainly upon local ownership participation and economic performance characterized by high rates of growth of production.

Role of Government in Synchronized Growth

Sunkel has argued that one of the greatest weaknesses of the social sciences and particularly of economics, has been their treatment of the role of the State in development

the State, the legitimate instrument of power and force is usually the crucial battle ground between the different social groups. It is a central factor in the process of development, playing a fundamental role in allocating the surplus generated by the foreign sector to new social groups (Sunkel, 1977, pp. 6-11).

Also Richardson has admitted that

in few countries is regional growth left to the free play of market forces. Government activity has both unintended and purposeful impacts on regional growth differentials (Richardson, 1973, p. 207).

More recently Holland has defined role of the modern capitalist state as

umpire (the rules of the game in dealing with leading firms, and the choice of particular national and regional policies); as regulator of government expenditure and its regional composition; as entrepreneur, deciding on the regional distribution of public enterprise; and as planner, in the sense of formalised forward policy-maker for the national economies (Holland, 1976, pp. 16-17).

A synchronized growth strategy recognizes the role of the State as direct and indirect participant in development processes. It assumes a certain level of democracy, as government ought to represent the interests of the whole nation and individual regions, which is often questioned in the case of developing countries. More radical theorists insist that the State represents only class interests (Cliffe, 1977). However today in many developing countries, including Latin America, the State will not usually represent only the interests of a particular social group, as it is often challenged by a growing power of organized labour and political opposition.

In a synchronized growth strategy the most important role of government is that of harmonization and development agent through its institutions and policies. First of all the State should cooperate with other actors in development, public, private, individuals and so on, to define regional development objectives, rather than assuming 'paternalistic' role in decision making. Those objectives cannot be set once for ever but they have to be revised continuously as regional conditions change and new needs and new problems arise.

Secondly, the government is responsible for the achievement of regional development goals and it should play a major role in initiating synchronization processes between all development agents. Synchronization processes should be supported by government's economic and social policies. In case of lack of regional and social efficiency criteria, government policies should try to restore 'modified' market mechanism where profitability criteria based on social costs and benefits will be used throughout

the country's system. One possible way of restoring market mechanism in developing countries is through manipulation of exchange rates (see Little, Scitovsky & Scott, 1970). According to the UNIDO's suggestions:

the main reason for doing social benefit-cost analysis in project choice is to subject project choice to a consistent set of general objectives of national policy. The choice of one project rather than another must be viewed in the context of their total national impact, and this total impact has to be evaluated in terms of a consistent and appropriate set of objectives (UNIDO, 1972, p. 11).

Thirdly, if there is no private initiative or serious conflict of interests occurs, such as private capital versus regional objectives, the State should assume a more active role in development by creation of new developments agents by itself, which could be a public development agency or state enterprise, or in cooperation with other partners which could lead to establishment of mixed enterprise with private capital.

Government's role as policy maker should be distinguished from its active participation in economic development. The basic difference lies in motivation as most government actions are influenced by political reasons.

Development agents, even though created by the same government should be subject to different laws, such as profitability and regional and social efficiency criteria, as they continue to operate within economic rather than political spaces. In other words the performance of a development agency or public enterprise may vary significantly from that of other government agencies, as well as from its other policies. While one could be positive, the other may be negative and vice versa, with respect to predefined regional development goals.

It is also true that in most countries

governments find it possible to take actions at the micro level that are not possible at the macro level because of political and administrative constraints (UNIDO, 1978, p.20).

The need for government intervention and a more active role in regional development will vary from time to time but it will not depend on a particular development stage. However it is possible that at earlier stages and in countries with significant regional disparities there is a need for more direct government involvement. Myint has argued that

a pioneering lead by the government is especially needed in the early stages of economic development when the private entrepreneurs would lack the knowledge and resources to venture into new risky lines of investment. But in practice, the expansion of the public sector in some underdeveloped countries frequently takes the opposite pattern of nationalizing or taking over the concerns which have already been successfully operated by private enterprise (Myint, 1973, p.145).

It is further suggested that the State use 'indicative planning' through introduction of incentives, both regional and sectoral rather than direct bureaucratic planning which often causes misallocation of scarce regional resources (see Myint, 1973).

Once the government's functions are explained it should be clear that certain systems, such as corporatism, represent only a very imperfect form of synchronized growth, though they may represent some progress compared with systems which do not allow any cooperation between government and other development partners, including private capital and trade unions. The basic difference between corporatism and recommended synchronized growth lies in the role of government which under the former

remains always the decision maker. As noted by Cox

In the final analysis, however, it is the state which dictates policy : sectional interests are subsumed within and overridden by the 'national interest' ...

In other words a situation is developing in which the mixed, mainly private market economy is giving way to a system of public control and private ownership (Cox, 1981, p. 79).

In 'synchronized growth' cooperation and partnership is preferred over the dominating position of one partner. The highly centralised system of decision-making is not advocated.

Conditions for Development Agents

Some similarities may be found between our concept of a development agent and the original idea of a growth pole, placed within Perroux's abstract economic spaces. However perhaps the differences with the growth pole/growth center supporters seem to be even more pronounced.

According to Gauthier

Perroux's growth pole corresponds to a dynamic sector in the economy which is often equated to a propulsive industry that exerts dominance through its forward and backward linkages over other manufacturing sectors of the regional economy (Gauthier, 1974, p. 21).

The concept of development agent does not require that the condition of dominance and linkages with the region's economy be satisfied, at the initial stage of regional development, as the forward and backward linkages with other sectors of the regional economy will be most likely very limited and the main positive effects on the region will be located elsewhere. The more important for our region could be creation of new jobs and the increase in regional incomes.

A synchronized growth strategy sets different conditions for development agents from those defined for growth centers. It is not necessary that all development agents which affect directly regional development be located within the strict geographical area of a given region. However it is essential that at least a few development agents involved in a production process be located within our region. The success of regional growth will depend then on their :

- a. new 'dynamic' form of business organisation or institutional framework, which serves better the predefined objectives of regional development and satisfies economic and non-economic conditions;
- b. progress in synchronization processes involving other national and regional partners in development;
- c. continuous expansion of their economic spaces through high rates of economic growth, possibly higher than other firms; establishment of forward and backward linkages with other firms, both local and foreign; growth of exports and generation of new regional employment and incomes;
- d. technological progress and contribution to development of local science and technology (S & T) capacities, through transfer and adaptation of technologies, creation of domestic R & D centers and various training programs.

The size of a development agent is less important and will depend on the requirements of a concrete industry. For instance, basic industries require generally larger firms which assure greater economic efficiency. On the other hand the achievement of specific regional objectives will only be

possible with more development agents, if they are small, and their number will depend on the economic needs of the region.

The creation of new development agents comes as a result of progress reached in application of a synchronized growth strategy. The initiative may come from private or public sources, or combined public-private interests. The expansion of new agents is based on their relative advantage over the existing regional actors, which is reflected through their superior contribution to regional development.

Technology as Missing Factor

The search for a 'magic solution' to regional problems has brought back the attention of many scholars to the role of technology in development. Earlier innovations played a central role in Schumpeter's theory of the expansion of the capitalist economy. Changes in production techniques were essential in Rostow's stages theory as well as in Perroux's growth poles.

Ayres believed in technological progress as a positive process, which brings in its own 'universal' values:

what happens to any society is determined jointly by the forward urging of its technology and the backward pressure of its ceremonial system...

since the technological revolution is itself irresistible, the arbitrary authority and irrational values of pre-scientific, pre-industrial cultures are doomed (Ayres, 1978, pXVII & p. XXXII).

Higgins has seen in technological progress a hope for underdeveloped regions (Higgins, 1968), though he has argued that most developing countries are short of Schumpeterian entrepreneurship as well as managerial, technical and labor skills. Radical theorists have analyzed 'technology problem' from a different viewpoint and seemed to have found one more link for the explanation of their universal dependency model (Frank 1967 & 1974; dos Santos, 1970, Wallerstein, 1974). According to the radical school, the possession and control of technology by industrialized countries have enabled them to maintain their dominating position and promoted further exploitation and subordination of less developed countries (see Roberge, 1978).

A synchronized growth strategy recognizes the importance of progress in technology as one of the major factors influencing regional development. For our purposes technology is being defined as that body of knowledge which is necessary for the production of goods and services (see Lake, 1979, p. 140). It is recognized that the central role in the supply of technologies is played by development agents, which include R & D centers. They are believed to generate or test new inventions and to convert them to technological innovations.

Most scholars would agree that there is a significant interdependence between the country's level of technology and its development stage. Even if we accept the 'tool combination' principle as a law of progress, we will still find our correlation to hold with most advanced countries being also the major suppliers of technology to the rest of the world. The main research is located in the same group of countries.

It is suggested that less developed countries have to develop their own S & T capacities if they want to promote regional development and fully benefit from economic growth. Presently technology required for production of goods and services is imported from industrialized countries. However it has been argued by many scholars that Western technology may not be the best suited to local conditions which may lead to misuse and misallocation of human and natural resources in developing countries.

Appropriate Technologies

A number of terms have been used in the existing literature, such as 'adaptive', 'appropriate', 'indigenous', 'intermediate', 'labor-intensive' and 'operative', to describe the different technology needs of less developed countries (Schumacher, 1974; Eckaus, 1977; Gosalia, 1977).

Appropriate technology seems to be one of the most widely accepted terms. It is referred to as using production methods which:

- a. are less sophisticated than those used in advanced countries, therefore may require smaller size of firms, lower skilled labor, and so on. Actually a great deal of less sophisticated machinery and equipment was introduced in a few developing countries by such organizations as the Intermediate Technology Group from London, Ford Motor Company and Philips;
- b. make better use of the country's human and natural resources, in most cases they should be more labor-intensive and less capital-intensive, while most Western technologies are believed to be highly capital-intensive and therefore their contribution to the reduction of high unemployment levels in less developed countries is rather limited.

In a typical production function, where:

$$Y(t) = F(a(t) K(t), b(t) L(t)), \text{ and}$$

a - index of capital - augmenting productivity growth;

b - index of labor - augmenting productivity growth;

L - labor; K - capital stock and t - time period, there seems to be

a considerable amount of factor substitutability depending on a particular choice of technology (Bruton, 1977, pp. 234-244).

Appropriate technologies are especially advocated for backward regions (UNIDO, 1978 & 1979). Eckaus suggests that

since the use of any particular technology is not an end in itself, the criteria of appropriateness for the choice of technology must be found in the goals of development (Eckaus, 1977, p. 10).

The 'basic needs' approach insists on small scale industries and simple production methods using local resources. Abonyi states that

the technological requirements for development (within the framework of a basic needs approach)... must then concentrate more than in the past on meeting the requirements of small farmers, small-scale rural industry, and the producer in the informal sector. Such a strategy requires appropriate technology different from those developed in and for industrialized countries, even more so than differences in factor endowment imply (Abonyi, 1979, p. 20).

Technology Choices

The main problem with all theoretical considerations regarding the role of technology in regional development is their failure to accept and explain the reality of less developed countries. The supporters of labor-intensive or capital-saving technologies tend to overlook the fact that introduction of such technologies may be very expensive and in some cases may be even more expensive than so called capital-intensive technologies.

As noted by Helleiner

Even if developed country governments and private firms were to turn their activities toward development of suitable technologies for use in less developed countries these countries would remain dependent on imports that might well be expensive and uncertain (Helleiner, 1977, p. 311).

In many industries labor-intensive technologies simply do not exist, in other sectors where such technologies are available they may still contribute less to the creation of regional employment as the income linkages may be limited. It has to be noted also that labor or capital intensity is often an inadequate description of a technology. In most developing countries a number of production techniques are used from traditional to the most modern with various labor and capital intensities. And finally most of technological choices are made by individual firms or development agents which operate within different economic spaces and where their decisions are subject to:

- a. firm's industrial strategy which depends among others on its size, nature of its operations and competition;
- b. factor endowment and factor prices in a given country and its regions, which also includes labor quality, as in many less developed countries there is a serious lack of skilled labor; and labor productivity and labor attitudes: - a popular slogan among producers in Latin America is 'menos obreros, menos problemas', meaning fewer workers, fewer problems (see Strassman, 1968);
- c. government policies and regulations; for instance both import substitution and export promotion policies tend to favour the use of capital-intensive technologies developed in advanced countries. Government policies often contribute to higher labor costs for producers (labor policies) and lower capital costs (financial-policies).

In other words if the presently used technologies are not best suited to the interests of developing countries, it is because of factor price distortions due to market imperfections in those countries, govern-

ment intervention and global strategies of MNCs, which often worsen this situation. Following Hawtlyshyn's (1978) argument we could add bias towards capital-intensive technologies and consumer preferences which strengthen 'inappropriate' choice of production techniques in less developed countries.

It seems unlikely that government policies will radically change in the nearest future technology choices made by independent development agents, such as private companies. Instead policies could indirectly influence those decisions by changing relations within the economic spaces of development agents. Government policies and technology choices, such as through public and mixed enterprises should be based on 'shadow prices' rather than the existing factor prices, to reflect the relative abundance and scarcity of capital and labor and therefore to restore the market mechanism based on socio-economic efficiency criteria. It is also highly unrealistic to assume that private investors would be willing voluntarily to consider the same 'shadow prices' for their own technology choices, unless such prices reflect possible future trends. For instance labor costs will probably continue to increase at high rates in most Latin American countries.

A synchronized growth strategy further suggests for less developed countries a selective concentration of R & D efforts in those fields of S & T in which a given country may expect to have some comparative advantage in the future, rather than spreading limited resources over a great number of disciplines or trying to develop 'appropriate technologies' which may not reasonably be expected to exist, as conditions change within economic spaces. Similarly intermediate technologies would tend to maintain the present division

of our world into developed and underdeveloped regions.

Developing countries will have to continue to depend on technology imports and transfer of innovations from industrialized nations in order to grow and if they want to create their own S & T basis. And again there is a need for cooperation between development partners, both public and private, including MNCs which are presently the main agents in the international transfer of technologies and internationalization of the innovation processes.

The selective development of technological capacities in less developed countries should start with learning about technologies, imported from advanced nations, which should include 'absorption', 'assimilation' and 'adaptation' of foreign technologies, before major inventions and innovations could be expected from local research centers, scientists and engineers.

Vaitsos has argued that

Until they (i.e. developing countries) have mastered the already available technology or until they are able to copy foreign techniques or develop their own they are dependent and hence in a very weak initial negotiating position (Vaitsos, 1974, p. 132).

Laszlo has stressed that there are not only external but also internal obstacles to the transfer of technology from advanced countries.

These include :

- a. deficiencies in higher education in developing countries,
- b. isolation of the S & T systems from the rest of society,
- c. inadequate resources allocated to S & T,
- d. lack of planning and coordination of efforts,
- e. attitudes by the local private sector, which is reluctant to invest

in R & D, and

- f. insufficient information system about alternative technologies
(Laszlo et al., 1980).

Synchronized growth should stimulate both the demand for local S & T as well as the supply of technologies which would use regional skills and resources. Regional factors should progressively replace foreign inputs. The proposed strategy will also require changes of attitudes of the population, such as attitudes towards technical education in many developing countries, which presently hamper technological progress of under-developed regions. It may be that it is again the existing institutional framework which resists progress in the field of technology (see Biato, Guimarães & Poppe de Figueiredo, 1973). And again the lack of private initiative may call for more direct government involvement in the field of technology.

Role of Space in a Strategy of Synchronized Growth

The importance of space varies in regional growth theory.

Richardson has claimed that

any revision of regional growth theory must start from the explicit introduction of space and distance into the analysis, both in the sense of distance separating regions in the inter-regional system and of spatial differentiation within regions. If this premise is accepted, most of conventional economic theories and certainly all aggregate growth theory - have to be laid aside as irrelevant (Richardson, 1973, p. 51).

On the other hand Perroux went as far as to reject the significance of geographic space while giving priority to considerations of complicated relationships within his abstract economic spaces (Perroux, 1964).

Concept of Economic Space

A synchronized growth strategy suggests that though the main preoccupation of regional development should be with concrete geographic spaces and consequently regions and countries, solutions to regional problems should be sought mostly through affecting the economic spaces of regional actors, spaces which often do not coincide with the geographic area of a region, or a country.

Economic space is n -dimensional (great number of variables) and it is defined by the range and intensity of one's economic relations with others. Those economic relations include more than a simple flow of goods and services, as they practically touch all aspects of economic

development of regions and may include non-economic factors. Though our concept of economic space is topological, it is not in a sense abstract, as it can and should be at any moment in time related to and projected over a concrete geographical space.

It is important to notice that the proposed concept of economic space differs from notions of economic space used in geography and economics. For example Leszczycki's economic space constitutes a part of geographic space in which man lives and works. All human settlements are located within economic space (Leszczycki, 1974). To Boudeville economic space is the result of applying a mathematical space to a geographic one by using the conversion matrix; mathematical space is an abstract space defined by a certain number of variables, while geographic space is a space where man lives and where his activities take place (Boudeville, 1966 & 1968). Perroux in his studies insisted that there were as many abstract economic spaces as there were multiple forms of economic relations between different industries, economic units, firms, etc. (Perroux, 1964; see also Greenhut, 1970; Watts, 1980).

According to the proposed strategy the majority of regional problems can be understood only by studying relations within our economic spaces, rather than concentrating all efforts on a single region. The idea of closed regional systems cannot be accepted as it is argued that interdependent relationships among regions have dominating influence upon their development.

Much state action which offsets inequalities between regions has little to do with traditional regional policies. It may include social

welfare benefits, development of infrastructure, construction of roads, housing programs, education policies, health plans and so on. Government expenditure in these areas may significantly exceed that on regional programs including assistance to firms and industries which are encouraged to locate in underdeveloped regions.

In most cases regional planning uses only x-dimensional space (limited number of variables), which does not correspond with reality. Regional policies are often counterbalanced by other government programs; actions by MNCs, and other actors in development, which may have a strong influence upon regional growth and organization of space and have locational consequences promoting changes in the opposite direction leading to further strengthening of the dominating position of the central more advanced regions.

In synchronized growth all development agents operate within their own economic spaces and their positive effect upon regional development is determined by their successful expansion of those spaces. The creation of a new development agent and its growth will interfere with already existing economic spaces of other development agents elsewhere. The established agents may initially try to oppose a new partner and/or to restrict the expansion of its space. The strength of a new development agent and the progress of its economic space depends on its ability to introduce different forms of relationships and cooperation with other regional actors, as well as its capability to adapt to changing economic and non-economic conditions, such as for instance changing prices and changing political climate.

The input - output tables do not describe adequately the relations within economic spaces of development agents because of their basically static

character. However they provide valuable information on the relative sizes of economic spaces.

The continuous expansion of economic spaces could be secured through synchronization processes between all development agents and it will often lead to different institutional frameworks and changes in spatial organization of the region. It will also require some form of technological progress.

The projection of our economic space over a geographic space may lead into distinction of several areas or zones. Watts has identified the following zones :

- (1) the market area: simply, the area or areas within which an enterprise's products are sold
- (2) the supply area: the area or areas from which an enterprise receives its material inputs
- (3) the plant space: the area or areas within which an enterprise has located its plants.

(Watts, 1980, p. 51).

It seems that other zones could be distinguished, such as employment area, export area and technology area or areas.

Spatial Consequences of the New Strategy

It is believed that the persistence of the 'center-periphery' spatial model in the majority of less developed countries has negative effects not only upon backward regions but that it also creates additional problems at the center. Babarovic mentions the following adverse effects of the above model:

- a) excessive growth of metropolitan areas beyond a critical size, in which the diseconomies produced by congestion exceed external economies resulting from metropolitan concentration...
- b) over-concentration of economic activity in the centre to the detriment of the periphery's latent potentialities, which remain untapped, thus curtailing the expansion possibilities of the entire economy,
- c) marginality of a large part of the population of the periphery... (which) implies a restricted domestic market ...,
- d) marked interregional imbalances in levels of economic and social welfare, chances for personal advancement and so forth...
- e) growing tension between the peripheral regions and the centre, arising from the great disparity in living standards and in development prospects...
- f) isolation of remote and sparsely populated border areas far from the centre or from regional development foci..., thus weakening the nation's territorial cohesion (Babarovic, 1978, p. 193-194).

A synchronized growth strategy should lead to reduction of regional disparities and replacement of the 'center-periphery' model by the more spatially balanced model. The emergence of new cities and accelerated growth of the existing secondary urban centers is necessary for that purpose (see Richardson, 1975). The size of the secondary cities and their number will depend on a particular case study and overall characteristics

of the country and its regions. Generalizations about the optimal size of the cities seem to be of little practical use (see Friedmann, 1977).

In a synchronized growth strategy development impulses spread in spatially discontinuous forms within economic spaces of development agents. Those economic spaces may include more than a single region or one country. It is suggested that contrary to largely propagated ideas, distance is not the major factor in diffusion of innovations, which often does not occur in linear forms and neither is urban hierarchy as claimed by Berry (1972), Friedmann (1966), Pedersen (1975), Stöhr (1975) and others.

The existence of some form of 'urban hierarchy' in developing countries does not mean that development impulses are diffused through those structures. In fact innovations may spread increasingly from one or a few smaller urban centers to significantly larger ones, rather than in opposite direction as suggested by the classical model. Besides in less developed countries urban centers may have more linkages with outside - foreign centers than with other local agglomerations, and no particular pattern can be claimed with regard to diffusion processes.

On the other hand a certain urban hierarchy and integration of the country's urban centers seems desirable at later stages of development as an 'ideal spatial arrangement'. Changes in spatial organization should be introduced gradually to justify their viability and to test their usefulness rather than trying to impose them by arbitrary decisions at the initial stages of regional growth.

Contrary to the basic needs approach in our system regions do

not have to be self-sufficient, as self-sufficiency is regarded as unnecessary waste of regional resources. Instead regional specialization and interregional trade is encouraged based on a modified concept of comparative advantage. It is also a 'product-mix' of the system of regions which will determine number and size of required urban centers. Similarly, regional imbalances caused by factor endowments of different areas, may be necessary to promote development processes and to achieve the regional development goals. It is recognized that economic growth by its nature is unevenly distributed and continuous search for more balanced growth may play a positive role in regional development (see Hirschman, 1960; Higgins, 1968).

Joint Ventures as Development Agents

One particular form of business organization which could serve better today's objectives of regional development is a joint venture or mixed company. According to Friedmann (W.G.Friedmann) :

as a significant phenomenon of international business relations, the joint venture is overwhelmingly a postwar phenomenon ... (though) they existed before, although predominantly between industrially developed countries (Friedmann & Kalmanoff, 1961, pp. 258-259).

Definition of Joint Venture

For the purpose of the present study, by joint venture we will understand the commitment of funds, facilities and services by public and private, local and/or foreign capital to an industrial enterprise for an unlimited number of years (see Friedmann & Kalmanoff, 1961; Franko, 1971; Kretschmar & Foor, 1972; Tomlinson, 1970).

Dymsza has stated that

Joint business ventures may take any one of three forms :

- (1) an association between an international company and private local investors;
- (2) an association between an international company and local government agencies; or
- (3) an association between an international company and a number of local and foreign enterprises (Dymsza, 1972, p. 205).

In this thesis the major attention will be devoted to associations between local government agencies and foreign companies (MNCs).

The new enterprise may be owned jointly by two or more partners, but not necessarily on a 50 - 50 basis. Ownership participation is of secondary importance and should be such as to assure the achievement of regional development goals rather than to comply with the political aspirations of certain social circles. It is also true that

in many cases, the question of majority or minority participation is essentially a symbol rather than a reflection of the actual degree of control exercised over the operations of the enterprise (Friedmann & Beguin, 1971, p. 15; see also Fayerweather, 1978, p. 420).

Though in advanced countries the major shareholder has usually a dominant influence over the company's policies (Kretschmar & Foor, 1972), this is not true in less developed countries. Kalmanoff has claimed that even if a foreign company has a minority participation :

the de facto control exercised by the foreign partners may be as a result of a formal technical assistance or other type of agreement, or it may exist without formal agreement by virtue of the ability of the foreign partner to be of some special assistance to the enterprise, as for example in obtaining loans from foreign or international lending agencies (Friedmann & Kalmanoff, 1961, pp. 155-156).

Friedmann believes that partnership in a joint venture has two sides, technical and emotional :

on the technical side it is a joining of contributions, on the emotional side it is a feeling of united co-operative effort (Friedmann & Kalmanoff, 1961, p. 5).

What is more important for our synchronized growth is the fact that cooperation and harmonization of interests and actions between partners to a joint venture is not only institutionalized but also constitutes a basis for a new company's behavior as it has a deterministic influence upon its economic decisions and a relative success in regional development.

Advantages and Disadvantages of Cooperation

Joint ventures seem to have certain advantages over the existing more traditional forms of business organization particularly in developing countries. It is believed that joint ventures with mixed local and private foreign participation may assure maximization of 'trickling down' or 'spread effects' while eliminating or reducing negative effects which hamper regional development. They may also contribute to reestablishment of a 'modified' market mechanism, by promoting technocratic style of operations and to transfer and development of new technologies which make optimal use of regional resources. Joint ventures may also satisfy political conditions by encouraging local participation in development processes. Today, the political acceptance is often given a priority in many developing countries and must be respected when different forms of business organization are considered. Joint ventures may tend to stimulate national pride and reduce suspicions of foreign dependence, through combined - ownership, close cooperation between partners and the shared responsibility (see Gullander, 1976).

The success of joint ventures will depend on the coordination of interests and actions of all partners to the venture and their equal interest in planned and realized projects. This could be achieved only if a new company benefits all partners. Dymza has argued that many MNCs do not want to enter into joint ventures as :

they believe that the presence of local partners may limit their own flexibility in overall planning, operations, and control of their business worldwide (Dymza, 1972, p. 206).

MNCs' willingness to go into a joint venture depends also upon the nature of

the venture, product and technology, as it is

often suitable in industries involving fairly standardized technologies as compared with industries with the most advanced technologies and other unique product advantages. For example, joint ventures are common in the food, chemical, drug, industrial, and electrical machinery fields but not in computers (Dymsza, 1972 pp. 207-208).

On the other hand for developing countries joint ventures should be more beneficial in those areas where special know-how is involved, as the industrial cooperation with foreign partners is believed to promote the transfer of new technologies.

In the case of an MNC participation in a joint venture, the main advantages may lie with :

- a. reduced capital requirements and risks of operations in a host country;
- b. access to the local market, including raw materials, labor and infrastructure;
- c. more support and assistance from the local government; often special privileges, such as lower taxes, favourable conditions for repatriation of profits, and/or tariff reductions;
- d. possibly higher returns than other forms of investment;
- e. more political stability and better understanding of the local environment through collaboration with local associates. Cooperation with regional actors should be preferable to the alternative of confrontation and conflict.

Though traditionally MNCs, particularly American - based ones, have preferred to establish wholly owned subsidiaries in developing countries rather than to get involved in a direct cooperation with local partners, this situation has been changing. According to La Palombra and Blank

there is strong evidence that 100 percent equity ownership of overseas multinational subsidiaries is rapidly becoming a thing of the past ... (but) if host country pressure for

equity is universal, willingness of multinational firms to respond favorably to such demands is not (La Palombra & Blank, 1979, p. 103 and p. 148)

Despite many possible advantages joint ventures are not an easy form of industrial cooperation. Franko has analyzed the stability of joint ventures by using a product cycle-strategy choice model, which however is of little use to us as it assumes existence of no legal constraints in developing countries (Franko, 1971). Harvard's Comparative Multinational Enterprise Project suggests that there is an inverse correlation between the stability of joint ventures and stages in the product life cycle (see Tomlinson & Hills, 1978), but again it tends to neglect political factors which often lead to the creation of joint ventures.

The areas of possible conflicts between partners to a joint venture are vast. Franko suggests that they may include :

1. conflicts over marketing and distribution policy;
2. conflicts over expansion of markets by joint-venture subsidiary in competition with another member of the multinational system;
3. conflicts over the rationalization of production among facilities related to the multinational parent found in different countries;
4. conflicts arising from disputes over royalties to be paid a multinational parent who wishes to allocate important R & D costs to, or derive monopolistic profits from, products produced by a joint venture;
5. conflicts over dividend payments versus the retention of earnings (Franko, 1971, p. 35).

Kalmanoff has argued that conflicts of interests between partners appear because MNCs and local companies are subject to different

influences, such as taxes, exchange rates which affect profits and

the interests of stockholders in different countries
(Friedmann & Kalmanoff, 1961, p. 170; see also *ibid.*
p. 265).

In other words conflicts of interests are caused by differences
in the relevant economic spaces within which national and foreign partners
operate.

Wright has noted that cultural differences between partners may
also cause a serious obstacle to the success of a joint venture.* Indeed, in
Japan cultural differences between Japanese and Western partners have already
undermined the existence of many joint ventures (Wright, 1979).

Conditions for Joint Ventures to be Classified
as Development Agents

Joint ventures help to satisfy some of the necessary conditions set for development agents. They represent a different institutional structure compared with subsidiaries of MNCs and by incorporating local partners they may gain political acceptance in the majority of developing countries. Joint ventures are also more likely to contribute to reestablishment of a 'modified' market mechanism while public enterprise remains subject to mainly political pressures. The participation of foreign partners in developing countries may be crucial for promoting a technocratic style of operation to fight excessive growth of bureaucratic practices, and to help transfer foreign innovations.

To be fully successful joint ventures have to assure that the following conditions are met :

1. progress in synchronization processes :

Joint ventures should contribute to harmonization of interests and actions at two different levels, among partners to the venture and with other development actors. The progress in cooperation between partners may be visualized, using essentially a subjective approach;

- a. as negative when important structural changes have taken place without the full consent of all partners or even perhaps largely against one's will. This could be caused, say, by the government's intervention, such as an imposed increase or reduction of one's share, forced introduction

of new partners, and even withdrawal of one or more partners.

All this may indicate that synchronization processes have not been very successful.

- b. as positive, when the status quo has been maintained and viewed by the partners as satisfactory or when structural changes have been introduced with the agreement and support of all partners. For a developing country the latter should reflect a gradual increase of local participation in shared responsibilities.

A strategy of synchronized growth calls for increased cooperation and harmonization of interests with other development actors. Such cooperation can be especially beneficial for firms operating within the same industry. The mutual benefits could be drawn from sharing of marketing channels, coordination of expansion policies, harmonization of training programs and cooperation in the field of technology. Any progress in regional cooperation can be reported when :

- a. important contacts with other firms have been established, such as consultations, meetings, and exchange of correspondence with the aim to increase coordination of interests and actions,
- b. any industrial cooperation agreements have been signed with other development actors;
- c. any mutual actions with other companies and/ or institutions have been taken which stimulate regional development.

2. expansion of economic spaces of joint ventures :

A pre-condition for expansion of development agents operating within

a given industry is suitable comprehension of their economic space. This includes general characteristics of the industry, supply and demand conditions, laws of competition, comparative advantage and technology change. The expansion of economic spaces of joint ventures, will depend on :

- a. their ability to increase steadily the volume of their physical production;
- b. their capacity to expand regional and national forward and backward linkages;
- c. their capacity to generate significant regional employment and incomes, items crucial to the successful growth of a regional economy, especially at the initial stages of development;
- d. their ability to expand exports, which under 'normal' conditions when prices are not subsidized, should also show the efficiency of a joint venture.

The expansion of economic spaces is also affected by progress in technology, but it will be discussed as a separate condition.

3. contribution to creation of local S & T capacities

Joint ventures with foreign partners should promote the technological advance of local economies. Their contribution to transfer of innovations is seen as one of the main advantages of this form of business organization. Their role is positive when they promote 'absorption', 'assimilation' and 'adaptation' of foreign technology by the local economy. Joint ventures should also strengthen the bargaining position of local partners in subsequent technology imports. Progress in the

technology field can be indicated when joint ventures

- a. have offered important modifications or adaptations of foreign knowledge to better suit the local conditions and regional factor endowments;
- b. have introduced successful training programs at all levels from management to low skilled workers;
- c. have promoted gradual transfer of management functions to local partners;
- d. have contributed to the creation of R & D centers in a host country; and
- e. have initiated significant cooperation with other regional and/or national R & D centers, scientists, engineers, etc.

Conclusion

A synchronized growth strategy has been suggested to stimulate regional development processes. This strategy is based on gradual changes in institutional frameworks through creation of new institutions or development agents and increased cooperation between all partners in development. The new institutions play a central role in synchronized growth and their actions could be compared to propulsive firms promoting regional growth and progress.

It has been argued that many traditional concepts borrowed from development theory can be still very useful if redefined and placed within a proper regional context. For example the choice of economic activities to be located in a given region can be based on a modified concept of comparative advantage. Also industrial specialization among regions and countries and export promotion are favoured over 'import substitution' and 'self sufficiency' policies.

In developing countries government actions are often required to initiate synchronization processes and to establish new development agents, particularly in cases where there is not enough interest from private capital. The degree of government intervention depends on how much progress has been made in achieving the specific regional objectives.

Despite growing criticism of foreign investments, it is believed that MNCs can still play a positive role in regional development through cooperation with local partners, as foreign companies continue

to offer scarce production factors much needed in less developed regions.

The proposed strategy recognizes the importance of technology transfer and foreign innovations for accelerated regional growth, but development of so called 'appropriate technologies' within the present institutional framework may not always be fruitful. Technology decisions are made by development actors and they are 'rational' insofar as they reflect the actual, albeit distorted, market conditions.

It has been suggested that joint ventures with foreign capital may play an important role as development agents. Their successful operation and contribution to regional growth depends on progress in synchronization processes, expansion of their economic spaces and contribution to creation of local S & T capacities.

An attempt will be made in the following chapters at relating this approach to some aspects of Venezuelan regional development. To do this, first selected problems of Venezuela's economic growth and its space economy will have to be discussed.

Scholars and policymakers are always posing stark alternatives before Latin America only to have the region evolve its own course. The key to understanding Latin America still eludes us: indeed, like El Dorado, it may not exist

J.W. Sloan, 1977

CHAPTER III

VENEZUELA'S ECONOMIC GROWTH AND SPACE ECONOMY

Main Characteristics of Venezuela's Economic Growth

If we place Venezuela today still within the group of so called developing countries, it is because development means more than is reflected by relatively high incomes per capita. In 1978 Venezuela's GDP per capita was close to Can. \$ 3,275 and it was the highest level in all Latin America. For that reason CIDA no longer considers Venezuela as a developing country.

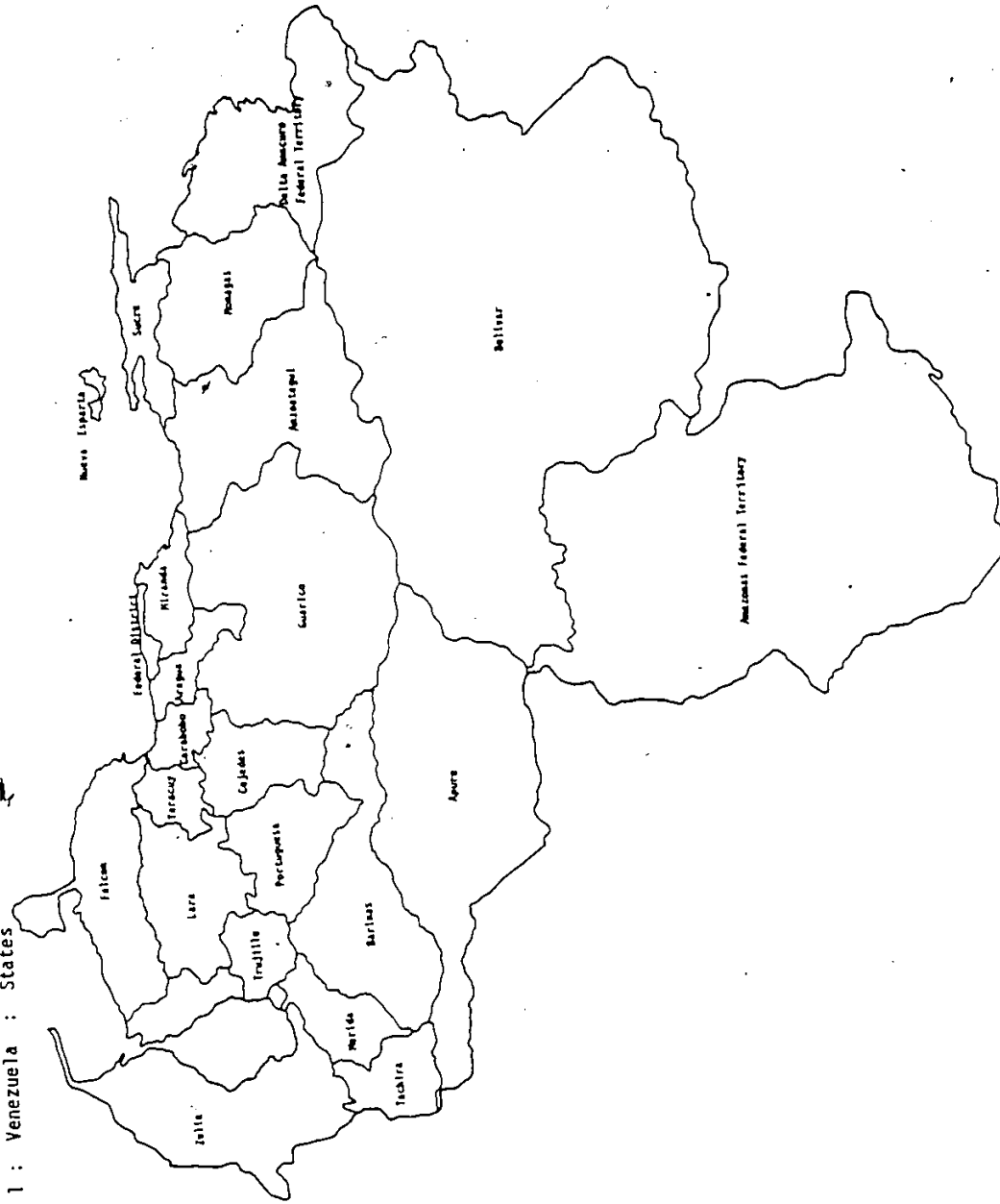
Despite high incomes, Venezuela suffers from development problems which are typical for a Third World country, rather than for an advanced economy. (see Brito Figueroa, 1972 & Maza Zavala et al., 1974).

Allen mentions the unequal distribution of land, wealth and incomes

A United Nations study places Venezuela among the countries with the greatest inequality in the early 1970s. The top 20 percent of income earners earned 65 percent of income, whereas the lowest 40 percent of income earners obtained only 8 percent of income (Allen, 1977, p. 120).

According to the Venezuelan Vth National Plan - 70 percent of the population is affected by malnutrition through deficits of calories and proteins

Map 1 : Venezuela : States



while on the other hand 5 percent of the population absorbed almost 1/4 of total incomes (Vth National Plan 1976-80, p. 12). Chossudovsky adds the rural and urban poverty, deficit of adequate housing and relatively high mortality rates (Chossudovsky, 1977). These problems seem to be intensified on a region to region basis with Venezuela's center being more fortunate and prosperous than the periphery.

Though it may appear that most of the above specified development problems could be solved by political decisions, that would also be a misleading simplification. Venezuela as well as many other developing countries certainly needs more social justice and more equal distribution of the country's wealth, but it also needs to further stimulate its economy in order to satisfy growing needs of an ever growing population.

The country does not follow any particular development model as suggested by theory, but some theoretical concepts may be used to provide insight into the growth path that has emerged. It is very difficult to determine the stage of development Venezuela has presently achieved according to Rostow's theory (Rostow, 1961). For example Friedmann has argued that the country reached the 'take-off' stage in the 1960s. (Friedmann, 1966). This seems highly questionable given the extent to which oil exports have continued to determine the rate of growth for the whole economy. Allen has claimed that

Venezuela still in 1975... had not reached the point where its growth was regular and sustained, generated from within itself and not vulnerable to even catastrophic reverses. Recession followed prosperity in an earlier period, succeeded by slow growth and once again prosperity, all dictated by external factors (Allen, 1977, p. 122 ; see also Marquez, 1976).

The present Venezuelan growth path differs also from the traditional primary-export based model, because 'trickling-down' effects have stimulated the growth of new economic sectors and some integration of the national economy has been reached. It does not mean that Venezuelan development has moved far towards full autonomy. The more appropriate term could be still 'dependent development' (Travieso, 1972). However, dependency has a new form today. It has certainly decreased in recent years, a point which dependency theorists perhaps fail to accept.

Venezuela has undoubtedly increased national control over its economy and today all major new industrial decisions are made by local investors whether through private or public decisions. At the same time foreign investments are subject to many restrictions and regulations. (see also Martz & Myers, 1976; Malave Mata, 1974).

Government Intervention

The Venezuelan economic growth is based upon two main factors: the generation of oil incomes and the role of government policies and spending (see Tables 2 & 3). While the importance of the oil sector for the growth of national and regional economies is unquestionable, despite its limited 'forward' and 'backward' linkages with other sectors, the role of government is somewhat less clear.

More radical scholars have questioned the government's contribution by claiming that it does not represent the interests of the nation and that it serves only the privileged minority class (Maza Zavala et al; 1974; and Chossudovsky, 1978). Rangel has argued that

TABLE 2

GROSS DOMESTIC PRODUCT BY SECTOR (Millions of Bolívares)

	1974	1975	1976	1977	1978	%
Agriculture	5,651	6,974	7,396	9,298	10,657	6.25
Crude Petroleum & Natural Gas	47,258	36,288	29,883	31,935	29,918	17.57
Mining	1,207	1,156	1,053	987	932	0.55
Manufacturing	24,943	20,889	22,841	24,629	27,457	16.12
Electricity & Water	1,193	1,407	1,540	1,829	2,254	1.32
Construction	4,449	6,201	8,252	11,484	14,206	8.34
Commerce, Restaurant & Hotels	8,814	11,355	13,266	15,211	16,714	9.81
Transport & Communications	8,676	11,063	13,599	17,130	21,950	12.89
Finances & Business Services	9,234	9,916	11,092	12,226	13,753	8.07
Social Services	3,703	4,389	5,013	6,782	8,028	4.71
Government	10,439	12,914	15,397	18,223	20,084	11.79
Other	2,174	2,795	3,164	3,835	4,376	2.57
Total	127,741	125,347	132,496	153,569	170,323	100
Total Spending	127,741	125,347	132,496	153,569	170,323	69.88
Total Consumption	56,391	70,492	84,791	101,488	119,021	55.11
Private	43,619	54,549	65,186	78,529	93,860	14.77
Government	12,772	15,943	19,785	22,959	25,161	41.37
Capital Formation	26,695	35,753	43,307	63,316	70,464	40.09
Investments Total	20,984	30,598	42,647	60,427	68,278	22.72
Private	14,176	12,533	25,050	36,764	38,691	17.37
Public	6,808	18,065	17,597	23,663	29,587	1.88
Variation	5,711	5,155	660	2,889	2,186	25.65
Exports, Goods & Services	66,174	49,455	42,188	45,158	43,685	36.90
- Imports, Goods & Services	21,519	30,353	37,970	56,393	62,847	

Source: calculations based on data from Anuario Estadístico 1978, Caracas 1980, p. 192 & Banco Central de Venezuela, Informes Económicos, 1974-1978.

TABLE 3

GROSS DOMESTIC PRODUCT BY SECTOR (Millions of 1968 Bolivares)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1978								
Agriculture	3,490	6.97	3,458	6.72	3,517	6.59	3,747	6.64	4,030	6.83	4,236	6.68	4,083	5.97	4,393	5.97	4,681	6.07
Crude Petroleum & Natural Gas	9,195	18.36	8,607	16.72	7,960	14.93	8,531	15.12	7,524	12.75	5,891	9.29	5,800	8.49	5,567	7.57	5,420	7.03
Mining	687	1.37	650	1.26	618	1.16	807	1.43	852	1.44	817	1.29	675	0.99	598	0.81	527	0.68
Manufacturing	8,018	16.01	8,582	16.18	8,890	16.67	9,152	16.22	9,639	16.34	10,684	16.85	11,935	17.46	12,316	16.74	12,942	16.78
Electricity	859	1.72	949	1.84	1,012	1.90	1,122	1.99	1,256	2.13	1,483	2.34	1,575	2.30	1,689	2.30	1,773	2.30
Construction	1,902	3.80	2,222	4.32	2,783	5.22	3,022	5.36	2,809	4.76	3,661	5.77	4,420	6.47	5,508	7.49	6,068	7.87
Commerce, Restaurants & Hotels	5,416	10.82	5,494	10.67	5,695	10.68	5,957	10.56	6,446	10.93	7,468	11.78	8,008	11.72	8,310	11.30	8,378	10.87
Transport & Communication	4,857	9.70	5,230	10.16	5,735	10.75	5,950	10.54	6,657	11.29	7,664	12.09	8,404	12.29	9,439	12.83	10,219	13.25
Financial & Business Services	6,093	12.17	6,345	12.33	6,719	12.60	7,135	12.64	7,498	12.71	8,452	13.33	9,266	13.56	9,588	13.03	10,001	12.97
Community Services	2,067	4.13	2,367	4.60	2,557	4.79	2,868	5.08	3,087	5.23	3,422	5.40	3,672	5.37	4,719	6.41	5,132	6.66
Government	5,278	10.54	5,540	10.76	5,945	11.15	6,198	10.98	7,128	12.08	7,850	12.38	8,622	12.61	9,363	12.73	9,812	12.72
Other	2,210	4.41	2,022	3.93	1,897	3.56	1,942	3.44	1,980	3.36	1,788	2.82	1,893	2.77	2,073	2.82	2,156	2.77
Total	50,072	100	51,466	100	53,328	100	56,431	100	58,989	100	63,416	100	68,353	100	73,563	100	77,109	100

Source: calculations based on data from: 1. Informe Economico 1974, BCV 2. Informe Economico 1978, BCV 3. Anuario Estadístico 1978, OCEI

the country belongs to twelve economic groups, whose unique position and incontestable influence establish the guidelines of the country's economic and political life (after Allen, 1977, p. 237).

These arguments are only convincing, however, to the extent that one accepts the political beliefs of their authors.

In fact, Venezuela now has a more democratic system than most of the developing countries and it does not differ significantly from the Western democracies. What is of interest is the fact that Venezuelan government has assumed certain responsibilities for progress in the country's national and regional development. Therefore government actions should be judged mostly on those grounds. In 1969 other Latin American countries recognized a need for more equitable distribution of incomes and greater participation of their population in development processes (the Declaration of Vina del Mar, see Stöhr, 1975, p. 75).

Venezuela's government has been greatly influenced by the country's dominating 'ideology', which consists of a mixture of attitudes and beliefs. The main elements of this 'ideology' may be listed as follows:

- a. growing nationalism in the sense of Venezuela for Venezuelans and by Venezuelans;
- b. a dependency complex, incorporating the lower skills and capabilities of Venezuelans as compared to industrialized countries and an over-dependence on foreign specialists and their expertise;
- c. the criticism of advanced nations and their alleged exploitation of developing countries, including Venezuela, with particularly strong feelings against the U.S.;

- d. hidden hostility versus foreign capital and MNCs;
- e. an admiration for developed countries, their economic systems, skills and organization;
- f. an admiration for the modern technology used in North America and Western Europe, and bias towards capital - intensive production processes;
- g. a need for confirmation of national skills by undertaking large scale projects of international importance, where size has a great popular appeal (Os, 1980 ; see also Rangel, 1977).

Similar ideologies seem to rule over economic decisions in other Latin American countries. Thus Robock, after studying regional planning experiences in Brazil, has suggested that

the philosophy, plans and performance of SUDENE (the Superintendency for the Development of the Northeast) can only be evaluated in relation to Brazil's political environment and the ultimate need in any development effort for political decisions (Robock, 1971, p. 103).

Hirschman adds lack of tradition in economic policies pursued by the consecutive governments in all Latin American countries

I was struck and disturbed by the prevalence, in Latin America, of a style of policy - making and problem solving that ostensibly denied the existence or even possibility of a cumulative learning process. Serious and protracted problems of public policy were tackled time and again , but each program

was presented as a totally new approach, only to be dismissed and denounced as an equally total failure when the next minister or government took office (Hirschman, 1973, p. V).

Tables 4 and 5 show that according to the perceptions of the Venezuelan elites foreign investments are important for the country's economic growth as they bring in capital and technology, but at the same time they may increase political and economic dependency much feared by Venezuelans.

A proper understanding of the government's motivation based on the country's ideology enables us to justify main policies and programs, which have been introduced in Venezuela and often run counter to pure economic reasoning. On the other hand the country's economy remains subject to mostly economic laws. The neglect of such laws by government has caused serious damage to regional economies and in many cases government has been forced to reverse its policies or to introduce significant changes and corrections. For instance the government policy towards the country's basic industries is guided mainly by the 'ideology' and nationalistic sentiments rather than by economic reality. Even in the nationalized oil industry the dependence on foreign companies has not been eliminated. Fortin has noted that

both concrete technical limitations in the ability to operate and expand the industry and to market the product, and the more general limits imposed by the need to remain in the international circuit of capital call for service agreement

TABLE 4

OFFICIALS' EVALUATIONS OF THE IMPORTANCE OF FOREIGN
INVESTMENT FOR THEIR NATIONS' ECONOMIC DEVELOPMENT

	Number of Respondents	Respondents describing foreign investment as						Mean
		Very Important		Moderately Important		Not Important		
		No.	%	No.	%	No.	%	
Bolivia	7	4	57	3	43	0	0	2.57
Colombia	10	1	10	4	40	5	50	1.20
Chile	6	3	50	2	33	1	17	2.33
Ecuador	8	7	88	1	13	0	0	2.88
Peru	18	2	11	6	33	10	56	1.55
Venezuela	4	0	0	3	75	1	25	1.75

Mean = 2.05

Standard Deviation = .648

@ The relationship between perceived importance of foreign investment and the actual amount of foreign investment is statistically very low. Pearson's r equals $-.18$ and Kendall's τ_{b} equals $-.20$ (Ferris, 1979, pp. 63-64).

Source: Ferris, 1979, p. 64

TABLE 5

ATTITUDES TOWARDS MNCs OF ELLITES IN VENEZUELA
(Survey of Businessmen, Government Officials and Students)

Views of Social and Economic Impact

	Type of Firm			
	National	U.S.	Other foreign	Mixed Ownership
Very beneficial	59.3%	16.1%	15.9%	30.0%
Beneficial	30.7%	53.1%	50.0%	54.6%
Neutral	8.7%	16.8%	19.7%	12.3%
Harmful	1.3%	9.1%	9.8%	1.5%
Very harmful	0.0%	4.9%	4.5%	1.5%
Principal Advantage of Foreign Investment for Country				
Brings in capital			20%	
Brings and develops technology			31%	
Economic support and development			25%	
Creates employment			7%	
Other			17%	
Principal Disadvantage				
Political and economic dependency			27%	
Company benefits more than host country			26%	
Harmful to economy			15%	
Negative effect on balance of payment			17%	
Other			15%	

Source: Fayerweather, 1978, pp. 147-148 (Truitt & Blake, 1976).

with the multi-nationals, whereby marketing of the oil is in the hands of the former owners (Exxon, Shell and Gulf); they furthermore provide technology to the nationalised companies, for which they are paid a flat fee per barrel of production. The compensation bonds are redeemable only in oil; the nationalisation law also allows for the creation of joint ventures, both in new and existing operations. The regime of the nationalised iron industry is essentially similar to that of oil in these respects (Fortin, 1977, pp. 48-55).

The Venezuelan government has introduced many policies that have aimed to promote regional development, but at the same time they have had negative effects upon the market mechanism, through further distortion of factor prices. Government labor policies have had a tendency to over-price labor by establishing minimum wage levels, fringe benefits, holidays, social security, severance payments and so on and to discourage producers from raising productivity levels, which are below those existing in advanced countries. The government sets also maximum prices for many products, including food, medicines, fuels and even rents (Allen, 1977, p. 88), which again seriously change supply and demand relations and may lead to slow growth of production of certain products and their inferior quality. This has already affected the country's agricultural sector which has experienced relatively low rates of growth (Tables 2 and 3) compared with other sectors of the Venezuelan economy.

One of the most popular charges against such government intervention in economic development is the inefficiency of public administration and the mismanagement of the country's human and natural resources, as the government continues to be motivated mainly by political reasons.

The World Bank mission has found that the Venezuelan policies were

severely circumscribed by the limited administrative capacity available in particular fields (International Bank for Reconstruction and Development, 1961, p. 15).

More than 15 years later Allen confirms the IBRD's observations and points to the growing bureaucracy in Venezuela:

the system of control and regulations is so complex that both the regulators and the regulated get lost in the labyrinth of norms, standards, restrictions and decrees. Many are obsolete, others are unenforceable. Still others, the government has never enforced or even tried to enforce (Allen, 1977, p. 87).

Such a system creates serious problems not only for foreign but also for local investors by discouraging and delaying investment decisions.

Polanco blames the inefficiency of the Venezuelan public administration upon the following factors:

- a. lack of technocratic organization in many administrative services;
- b. lack of knowledge and interest from the part of management to introduce reforms;
- c. lack of skilled personnel;
- d. multiplicity of functions, and
- e. very high costs of public administration (Polanco, 1972, pp. 93-104, see also Sloan, 1981).

The same factors seem to affect seriously the performance of public enterprises in Venezuela. That was the main reason why the IBRD's mission has recommended that

such (public-government) enterprise be placed under the direction of an autonomous authority with an independent governing board completely divorced from political pressures and influences, and second, that it be placed as nearly as possible on the same footing as a privately owned concern, subject to the same taxes, regulations and laws (IBRD, 1961, p. 235).

Government industrial policies have long been based upon an import substituting strategy of the type advocated by development theory along the Prebisch - Singer line. Import substituting industrialization has led indeed to the creation of new industries protected from import competition by prohibitively high tariffs. The growth of the manufacturing sector has been based upon the existing demand for certain products, mostly consumers' goods (see Merhav, 1974).

Scitovsky has argued that import substitution industrialization has to begin with the final stages of production as protection policies establish highest tariffs for consumers' goods and relatively lower for intermediate and capital goods (Little, Scitovsky and Scott, 1970, pp. 59-60).

Import substitution has also brought new problems. Most of the newly created industries have operated at much higher costs than their competitors in many other countries, and so have been unable to sell their products in foreign markets. The protection policies have promoted a seller's market which has tended to undermine technical and economic standards throughout the country. Import substituting industrialisation has also neglected the principles of comparative and absolute advantage. As it has been noted by the UNIDO's study:

import substitution tends to spread production resources over a range of industries, not necessarily stressing those in which the country has a natural advantage (UNIDO, 1969, p. 8).

The import substituting strategy has increased rather than decreased the country's dependency upon foreign trade. Allen has claimed that in today's Venezuela

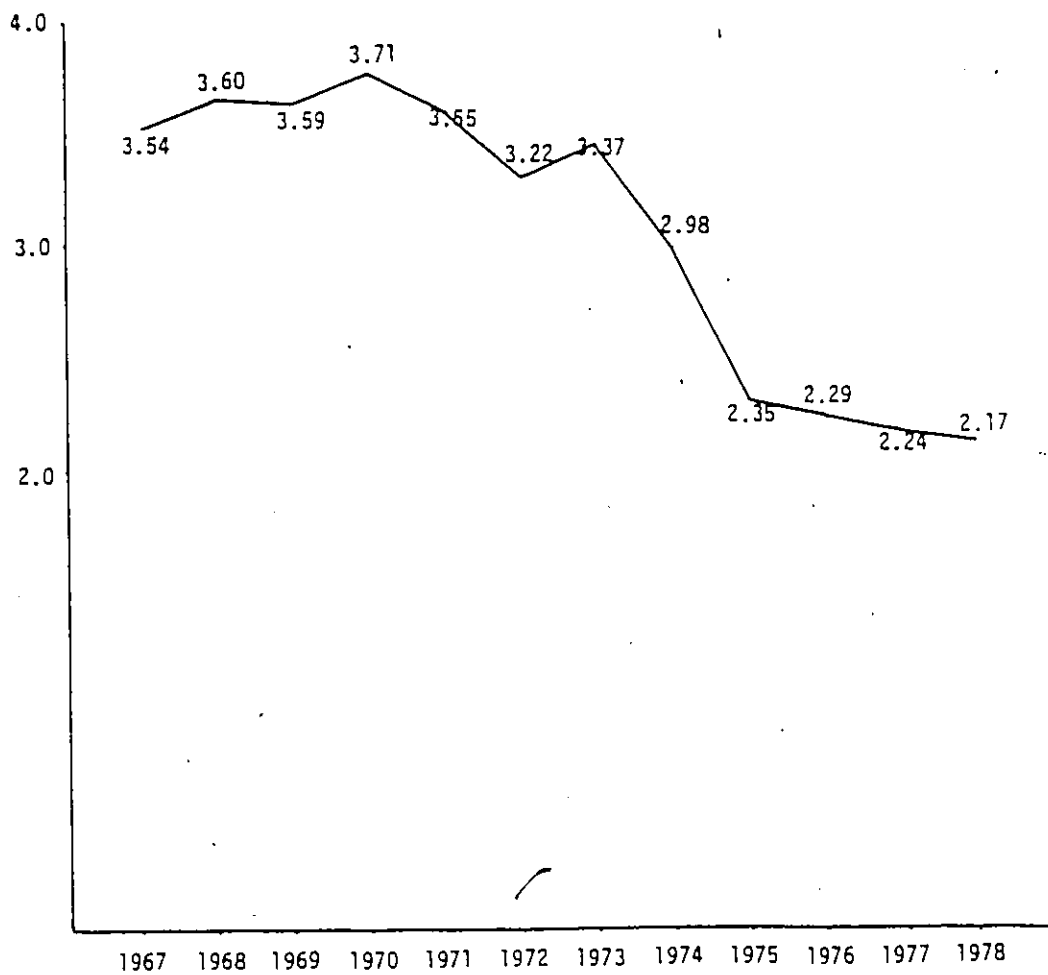
dependence on imported goods remains almost as pronounced as two decades ago, although the composition has shifted from final manufactures to industrial goods for industry (Allen, 1977, p. 233; see also Acedo Mendoza, 1971).

It is true that before import substitution was introduced, it has been much easier to control the external sector by means of different forms of import restrictions, which could affect mainly final consumers rather than other sectors of the economy. The necessity to import intermediate products and materials, machinery, technology and foreign services, as important inputs for the national industries has generally increased the 'dependence' of the Venezuelan economy upon external factors and foreign supplies and has promoted further import substitution and protectionism policies.

Dominance of the Oil Sector

Venezuela is a typical oil economy with overdependence on oil as a major generator of national income and particularly as the source of foreign exchange. Despite the continuous decrease in oil production in recent years, especially since 1970, when the production reached the record level of 3.71 million barrels per day (see Figure 2

Figure 2 : Crude Oil Production in Venezuela / In Million Barrels Per Day (mbpd) /



1 barrel = 0.136 ton

1 barrel per day = 49.8 tons per year

Source : 1. VBO, 1976, p. 56 ; 2. Anuario Estadístico, 1980, p. 321

and Table 6), the oil sector still retains its leading position in the country's economy. In 1978 when production went down to 2.17 million bs per day, oil sector accounted for over 17 per cent of the GDP measured in current prices (Table 2). This was, however, a very significant decrease from 1974 level, when the same sector constituted 37 per cent of the GDP.

The dominance of the oil sector in the Venezuelan economy has been assured by the higher prices generated in international markets (see Table 7). The composition of the GDP in constant prices, shown in Table 3 indicates that the importance of oil for the national economy has actually declined, and in 1978 it contributed only 7 per cent to the GDP, which was even below the planned level.

Exports of oil have diminished also, for in 1978 Venezuela exported 1.90 million bs per day compared to 2.75 million bs per day in 1974 (Table 7). Compared with 1974, set at a level of 100, the index for exports was 68.90 in 1978 while the production index was 58.49. Despite this oil and by-products have continued to dominate the Venezuelan exports contributing over 90 per cent of the total value of products sold to other countries (Table 8). In 1975 oil exports accounted for 95.5 per cent of the total value of exports. Such overdependence on oil is dangerous as any change in external demand or prices may affect basically all sectors of the economy.

According to the government studies and predictions the oil incomes will not be able to satisfy importation needs of the growing Venezuelan market (CVG, DEPI, 1978). However in 1980 export earnings from

TABLE 6

OIL PRODUCTION, EXPORTS AND CONSUMPTION (Thousand Barrels per day)

	1917	1922	1927	1932	1937	1942	1947	1952	1957	1962	1967	1972	1977
Crude Oil Production	0.3	6.1	165.5	319.0	508.9	405.9	1,191.5	1,803.9	2,779.2	3,199.8	3,542.1	3,219.9	2,237.9 ^f
Crude Oil Exports	-	-	-	-	-	429@	1,086	1,451	2,079	2,221	2,429	2,132	1,321
Crude Oil Processed	-	-	-	-	-	60@	101	352	689	1,025	1,166	1,125	970
Internal Consumption	-	-	-	-	-	15@	30	62	..	156	183	228	271
Refined Products Exports	-	-	-	-	-	49@	74	259	497	798	932	932	643
Reserves of Crude Oil (Million Barrels)	..	..	..	..	..	..	7,300	9,200	15,600	16,800	16,000	13,900	18,200

@ corresponds to year 1943, -,... not available

Source: Venezuela and its oil industry, Emb. of Venezuela, Ottawa, May 1979; Petroleo y Otros Datos Estadísticos - Ministry of Energy and Mines, Caracas.

TABLE 7

OIL SECTOR: EXPORTS, INCOMES & EMPLOYMENT

1. Exports of Oil

	Thousand Barrels Per Day				
	1974	1975	1976	1977	1978
	2,752	2,086	2,138	1,985	1,896
Index	100	75.80	77.69	72.13	68.90

	Millions of Bolivars				
	45,072	36,106	37,320	39,481	36,163
II. Oil Incomes					
	46,563	37,966	39,257	41,724	38,240
III. Employment (& Earnings in Millions of Bolivars)					
	23,652	23,083	23,824	25,102	26,120
	(1,560)	(1,948)	(1,581)	(1,256)	(1,921)

Source: 1. Anuario Estadístico 1978, Caracas, 1980, pp. 327, 328 & 334;

2. Ministerio de Energía y Minas, Memoria y Cuenta, 1978.

TABLE 8

VENEZUELA: EXPORTS BY MAIN PRODUCTS

Millions of Bolivars

	1965	1968	1971	1973	1975
Iron Ore	540.4	453.4	623.6	701.4	1,163.0
Steel (Bars)	21.2	60.9	33.0	75.7	-
Steel (Pipes)	3.2	7.1	1.0	5.4	1.5
Aluminum	-	14.7	32.0	25.7	44.7
Oil & By-Products	10,144.4	10,663.7	13,694.8	22,236.3	44,665.7
% of Total	92.85	93.01	92.69	94.26	95.46
Other	215.8	265.4	390.3	547.1	915.9
Total	10,925.0	11,465.2	14,774.7	23,591.6	46,790.8

Source: 1. M. Izaguirre, 1977, p. 88

2. Segundo Mensaje Presidencial, Presidente Perez, 1976, Cuadro 34

oil reached \$17 billion, which is almost \$2.5 billion more than estimated (The Latin American Times, February 1981, p. 31).

Though oil incomes continue to provide the main source of revenues, the oil sector has rather limited linkages with the national economy. It provided only 26,120 jobs in 1978 (Table 7) which was less than 1 per cent of the country's total employment and less than 4 per cent of the total manufacturing employment estimated at 689,222 in the same year (Anuario Estadístico, 1980, p. 84; see Salazar Carillo, 1976).

Manufacturing Industries¹

The manufacturing industries have continued to expand steadily, unlike the oil production, but the growth rates have still not been sufficient to bring in the desired change in the country's economic structure. The planned average growth rates per year for the manufacturing sector for the period 1970 - 1980 were 11.5%, while in reality the industries grew at 8.4% in 1970 - 1978 (Table 9). As a result the manufacturing sector was unable to increase its 16 per cent share in the GDP. In 1978 its share was 16.12 per cent of the GDP (Table 2) while the government plans had suggested an increase of manufacturing's contribution to over 20 per cent, with 22.42 per cent in 1978 (Table 10). However, the manufacturing industries have experienced real growth and constant prices of 1968 suggest a very small increase of the industrial share in the GDP, from 16.01% in 1970 to 16.78% in 1978 (Table 3).

TABLE 9

ECONOMIC GROWTH OF VENEZUELAN ECONOMY:

1. GDP - Average Growth Rates per Annum

Development Plans	Target	Achieved
First 1960 - 1964	7.0%	4.5%
Second 1963 - 1966	8.0%	5.0%
Third 1965 - 1968	7.0%	4.3%
Fourth 1970 - 1974	6.3%	4.2%
Fifth 1976 - 1980	8.2%	6.4% (1975-78)

2. Manufacturing Sector - Average Growth Rates per Annum

First 1960 - 1964	14.4%	9.2%
Second 1963 - 1966	13.5%	7.9%
Third 1965 - 1966	10.8%	5.4%
Fourth 1970 - 1974	9.4%	7.4%
Fifth 1976 - 1980	13.7%	9.5% (1975-78)

3. Contribution of Manufacturing Sector to GDP

First 1960 - 1964	15.4%	14.4%
Second 1963 - 1966	20.0%	14.7%
Third 1965 - 1968	19.8%	14.9%
Fourth 1970 - 1974	23.2%	16.3%
Fifth 1976 - 1980	22.4%	16.5% (1975-78)

- Sources: 1. Venezuelan Business Opportunities, 1976, pp. 37-38
 2. Vth National Plan 1976-80
 3. Anuario Estadístico 1978, Caracas 1980

TABLE 10

GROSS DOMESTIC PRODUCT BY SECTOR (Millions of 1968 Bolivares) - according to the Vth national plan

	1975 %	1976 %	1977 %	1978 %	1979 %	1980 %
Agriculture	4,370	4,763	5,211	5,722	6,271	6,911
Crude Petroleum & Natural Gas	7,461	6,357	6,675	6,995	6,995	6,995
Mining	916	1,021	1,078	1,155	1,249	1,310
Manufacturing	12,547	14,190	16,179	18,494	20,957	23,890
Electricity	1,409	1,587	1,807	2,085	2,425	2,842
Construction	3,202	3,663	4,190	4,819	5,552	6,423
Commerce, Rest. & Hotels	6,994	7,428	7,933	8,504	9,142	9,855
Transport & Communication	7,496	8,028	8,614	9,252	9,964	10,761
Finances	8,015	8,432	8,938	9,474	10,042	10,645
Other Services	13,463	14,217	15,056	15,974	16,980	18,135
Total	65,872	69,686	75,681	82,474	89,577	97,737
		100	100	100	100	100

Source: calculations based on data from Vth Plan de la Nacion 1976 - 1980, Caracas, Nov. 1976, p. 62.

Within the manufacturing sector important structural changes took place, as there was an important shift towards 'modern sector' which has experienced higher rates of growth, than 'traditional industries'. As a consequence such industries as food production, textile and clothing, leather products and furniture have diminished their share in the total value of industrial production from 44.14 per cent in 1971 to 35.45 per cent in 1977 (Table 11). At the same time mechanical industries, including metal products, machinery and transport equipment have increased their share in manufacturing output from 15.35% in 1971 to 18.77% in 1977. Intermediate industries such as pulp and paper, chemical products, petroleum products and basic metals have moved from 40.61 per cent share to 42.59 per cent in the same period of time. Relatively lower gains by the latter group could be due to lower prices for intermediate products, which are supported by the government policies (Table 12).

The similar tendency is confirmed by value added shares in the manufacturing sector. In 1971 'traditional industries' kept still their leading position and the value added of this sector accounted for 43.16 per cent of the total value added of the Venezuelan manufacturing. In 1977 the same share dropped down to 29.84 per cent with a dramatic increase in the importance of intermediate industries and their contribution to the value added of the country's manufacturing industries, from 36.65 per cent in 1971 to 52.15 per cent in 1977. At the same time the share of mechanical industries in the value added has decreased from 16.35 per cent in 1971 to 14.25 per cent in 1977 (Table 13). Again these figures

GROSS PRODUCTION VALUE IN MANUFACTURING
(Thousands of Bolivars)

SECTORS	1971	%	1977	%
Traditional Industries	9,998,104	44.14	27,912,449	35.45
Food	4,881,453	20.09	12,991,861	16.50
Beverages	1,307,210	5.38	3,703,636	4.70
Tobacco	508,661	2.09	948,313	1.20
Textiles	1,262,382	5.19	3,591,745	4.56
Clothing	897,404	3.69	2,966,587	3.77
Leather & Leather Prod.	147,824	0.61	391,763	0.50
Footwear	329,486	1.36	1,039,276	1.32
Wood Products	292,706	1.20	936,938	1.19
Furniture	370,978	1.53	1,342,330	1.70
Intermediate Industries	9,869,643	40.61	33,536,654	42.59
Pulp & Paper	868,025	3.57	2,492,179	3.16
Chemicals	1,640,453	6.75	5,492,964	6.94
Petroleum & Coal Products	4,471,014	18.40	15,602,634	19.81
Rubber & Rubber Products	469,897	1.93	883,086	1.12
Plastic Products	284,404	1.17	1,609,233	2.04
Non-metallic Minerals & Products	1,007,769	4.15	3,127,374	3.97
Iron & Steel Industry	972,942	4.00	3,694,042	4.69
Non-ferrous Metals	155,139	0.64	665,142	0.84
Mechanical Industries	3,731,225	15.35	14,780,496	18.77
Metal Products	1,024,750	4.22	3,992,230	5.07
Machinery (excluding Electric)	202,275	0.83	1,641,672	2.08
Machinery and Electric Equip.	695,684	2.86	2,119,788	2.69
Motor Vehicle Industry & Transport Equipment	1,808,516	7.44	7,026,806	8.92
Residual Group	702,523	2.89	2,516,314	3.20
Graphic Arts	490,291	2.02	1,800,842	2.29
Others	212,232	0.87	715,472	0.91
TOTAL	24,301,495	100	78,745,913	100

Source: Calculations based on data from: 1. III Encuesta Industrial 1971 - CORDIPLAN, 1973
2. VII Encuesta Industrial 1977 - OCEI, 1980.

TABLE 12

PRICES BY MAIN GROUPS OF PRODUCTS (1968 = 100)

(Index & % Variation)	1974	%	1975	%	1976	%	1977	%	1978	%
Intermediate Products	131.9	18.5	148.8	12.8	161.5	8.5	174.8	8.2	185.5	6.1
National	129.9	17.5	145.4	11.9	154.4	6.2	168.5	9.1	179.7	6.8
Imported	135.1	20.0	154.2	14.1	173.0	12.2	184.9	6.9	194.9	5.4
Consumers' Goods	131.1	13.5	149.6	14.1	163.0	9.0	184.1	12.9	196.2	6.6
National	132.0	14.0	150.5	14.0	165.3	9.8	188.1	13.8	201.7	7.2
Imported	127.8	11.8	146.5	14.6	155.6	6.2	171.1	10.0	178.4	4.3
Food Products	136.1	13.2	154.81	13.7	169.7	9.6	196.1	15.6	208.6	6.4
National	136.9	13.9	157.1	14.8	174.0	10.8	204.4	17.5	217.2	6.3
Imported	132.6	10.3	144.5	9.0	150.3	4.0	158.6	5.5	170.1	7.3
Machinery & Equipment	145.3	16.7	167.4	15.2	175.5	4.8	189.0	7.7	204.4	8.1
National	155.4	37.4	187.3	20.5	194.3	3.7	217.9	12.1	242.1	11.1
Imported	144.2	14.6	165.3	14.6	173.5	5.0	185.7	7.0	200.2	7.8

Source: 1. Anuario Estadístico 1978, Caracas, 1980, p. 281;

2. Banco Central de Venezuela, Informe Económico 1978,

VALUE ADDED IN MANUFACTURING
(Thousands of Bolivars)

SECTORS	1971	%	1977	%
Traditional Industries	4,470,195	43.16	11,188,073	29.84
Food	1,737,016	16.77	3,680,524*	9.82
Beverages	908,898	8.78	2,354,303	6.28
Tobacco	148,780	1.44	653,482	1.74
Textiles	697,702	6.74	1,858,517	4.96
Clothing	458,554	4.43	1,127,759	3.01
Leather and Leather Prod.	64,364	0.62	158,495	0.42
Footwear	138,550	1.34	391,788	1.04
Wood Products	132,008	1.27	402,903	1.07
Furniture	184,323	1.78	560,302	1.49
Intermediate Industries	3,795,553	36.65	19,551,998	52.15
Pulp & Paper	410,349	3.96	1,154,348	3.08
Chemicals	974,207	9.41	3,117,000	8.31
Petroleum & Coal Products	798,348	7.71	10,311,588	27.50
Rubber & Rubber Products	256,280	2.47	434,133	1.16
Plastic Products	144,386	1.39	830,460	2.21
Non-metallic Minerals & Prod.	641,644	6.20	1,809,142	4.82
Iron & Steel Industry	489,679	4.73	1,605,197	4.28
Non-ferrous Metals	80,660	0.78	290,130	0.77
Mechanical Industries	1,692,952	16.35	5,341,378	14.25
Metal Products	532,811	5.14	1,733,258	4.62
Machinery (excluding Electric)	111,262	1.07	825,566	2.20
Machinery and Electric Equip.	349,909	3.38	857,584	2.29
Motor Vehicle Industry & Transp	698,970	6.75	1,924,970	5.13
Residual Group	397,943	3.84	1,412,145	3.77
Graphic Arts	280,135	2.70	987,609	2.63
Others	117,808	1.14	424,536	1.13
TOTAL	10,356,643	100	37,493,594	100

Source: Calculations based on data from: 1. III Encuesta Industrial 1971 - CORDIPLAN, 1973
2. VII Encuesta Industrial 1977 - OCEI, 1980.

are distorted by changes in prices and superficially high oil revenues.

The Venezuelan manufacturing sector has increased significantly its dependence upon foreign supplies. In 1971 the traditional industries imported only 16.22 percent of their total input requirements. This share has increased to 21.46 per cent in 1977 for a total value of over Bs 3.3 billion (Tables 14 & 15). Similarly imported inputs for the intermediate industries have jumped from 17.82 per cent in 1971 to 29.56 per cent in 1977, despite the very rich natural resources of the country. The dependence upon foreign inputs remains more pronounced in the third group defined as the mechanical industries, though the sector has actually managed to diminish its foreign content from 55.52 per cent in 1971 to 49.28 per cent in 1977. This situation may be disturbed by the fact that a great number of inputs which are classified as national are in fact intermediate products or final products assembled in the country and have a high percentage of imported materials and products.

The increased foreign share in the Venezuelan industries has been made possible by skyrocketing export oil prices (Table 16), though this tendency may not necessarily continue in the future. Venezuela will have to develop new export industries to be able to pay for rapidly increasing imports.

The relatively slow growth of new industries is often blamed on the lack of sufficient demand. It is true that unequal income distribution worsens this situation (see Walker, 1978). On the other hand internal demand depends not only on the size and distribution of incomes but

TABLE 14

INPUTS IN MANUFACTURING SECTOR BY ORIGIN (Thousands of Bolivars) MATERIALS - 1971					
SECTOR	National	%	Imported	%	Total (100)
Traditional Industries	4,427,116	83.78	857,111	16.22	5,284,227
Food	2,563,159	84.29	477,736	15.71	3,040,895
Beverages	279,427	74.56	95,348	25.44	374,775
Tobacco	336,278	96.37	12,662	3.63	348,940
Textiles	364,421	69.45	160,319	30.55	524,740
Clothing	363,403	89.38	43,165	10.62	406,568
Leather & Leather Products	52,288	65.70	27,292	34.30	79,580
Footwear	166,705	91.24	16,000	8.76	182,705
Wood Products	138,496	92.56	11,128	7.44	149,624
Furniture	162,939	92.37	13,461	7.63	176,400
Intermediate Industries	4,755,063	82.18	1,030,871	17.82	5,785,934
Pulp & Paper	253,886	58.57	179,557	41.43	433,443
Chemicals & Chemical Products	309,652	49.51	315,736	50.49	625,388
Petroleum & Coal Products	3,563,762	98.82	42,579	1.18	3,606,341
Rubber & Rubber Products	82,527	41.50	116,332	58.50	198,859
Plastic Products	50,070	39.50	76,691	60.50	126,761
Non-metallic Minerals & Products	230,780	77.22	68,087	22.78	298,867
Iron & Steel Industry	235,372	54.60	195,706	45.40	431,078
(Basic Metals)	264,386	53.27	231,889	46.73	496,275
Non-ferrous Metals	37,114	53.42	32,364	46.58	69,478
Mechanical Industries	873,559	44.48	1,090,569	55.52	1,964,128
Metal Products	268,726	57.74	196,648	42.26	465,374
Machinery (excluding Electric)	50,555	57.66	37,117	42.34	87,672
Machinery & Electric Equipment	144,780	44.09	183,621	55.91	328,401
Motor Vehicle Ind. & Transport	409,498	37.82	673,183	62.18	1,082,681
Residual Group	148,312	52.02	136,817	47.98	285,129
Graphic Arts	97,235	49.28	100,093	50.72	197,328
Others	51,077	58.17	36,724	41.83	87,801
TOTAL	10,204,050		3,115,368		13,319,418

Source: Calculations based on data from: 1. III Encuesta Industrial, CORDIPLAN, 1973
2. VII Encuesta Industrial, OCEI, 1980.

TABLE 15

INPUTS IN MANUFACTURING SECTOR BY ORIGIN (MATERIALS)
Thousands of Bolívars - 1977

SECTOR	National	%	Imported	%	Total (100%)
Traditional Industries	12,295,282	78.54	3,359,826	21.46	15,655,108
Food	6,878,775	77.04	2,049,814	22.96	8,928,589
Beverages	835,359	67.12	409,211	32.88	1,244,570
Tobacco	248,853	88.44	32,524	11.56	281,377
Textiles	1,119,400	74.07	391,798	25.93	1,511,198
Clothing	1,516,762	91.85	134,590	8.15	1,651,352
Leather & Leather Prod.	148,554	68.15	69,420	31.85	217,974
Footwear	592,020	96.11	23,969	3.89	615,989
Wood Products	334,136	68.95	150,449	31.05	484,585
Furniture	621,423	86.37	98,051	13.63	719,474
Intermediate Industries	8,840,756	70.44	3,710,429	29.56	12,551,185
Pulp & Paper	598,528	49.47	611,454	50.53	1,209,982
Chemicals	1,122,941	51.85	1,042,651	48.15	2,165,592
Petroleum & Coal Products	4,818,855	97.73	111,940	2.27	4,930,795
Rubber & Rubber Products	129,614	32.10	274,158	67.90	403,772
Plastic Products	381,416	53.29	334,304	46.71	715,720
Non-metallic Minerals & Pr.	741,594	82.34	259,031	27.76	900,595
Iron & Steel Industry	879,786	48.04	951,496	51.96	1,831,282
Non-ferrous Metals	168,052	57.27	125,395	42.73	293,447
Mechanical Industries	4,525,594	50.72	4,396,875	49.28	8,922,469
Metal Products	1,440,310	70.50	602,708	29.50	2,043,018
Machinery (excluding Electric)	415,617	55.94	327,337	44.06	742,954
Machinery & Electric Equipment	576,768	48.22	619,317	51.78	1,196,085
Motor Vehicle Ind. & Transp.	2,092,899	42.36	2,847,513	57.64	4,940,412
Residual Group	561,320	57.30	418,522	42.72	979,842
Graphic Arts	400,885	55.13	326,276	44.87	727,161
Others	160,435	63.54	92,246	36.54	252,481
TOTAL	26,222,752		11,885,652		38,108,404

Source: Calculations based on data from: 1. III Encuesta Industrial, CORDIPLAN, 1973

2. VII Encuesta Industrial, OCEI, 1980.

TABLE 16

VENEZUELAN EXPORT VOLUME AND PRICE AND IMPORT PRICE INDEX 1970 - 1975 (1970 = 100)

	1970	1971	1972	1973	1974	1975
Petroleum Exports	100	94.5	89.4	92.4	79.3	63.6 (Sept.)
Crude Petroleum Exports	100	95.0	87.8	87.2	72.8	68.9 (Sept.)
Refined Product Exports	100	93.5	93.0	103.8	93.5	51.9 (Sept.)
Iron Ore Exports	100	92.0	79.0	104.0	126.0	103.0 (Nov.)
Petroleum Export Price	100	100	112	126	381	501 (Sept.)
Iron Ore Export Price	100	106	112	107	134	192 (June)
Import Price Index	100	105.3	109.7	115.6	134.4	153.3 (Oct.)

Source: International Financial Statistics, March, 1976, pp. 412 - 413

(after L. Allen, 1977, Appendix).

also on the consumption patterns and attitudes of the entire population. The Venezuelan demand model is shaped after consumption patterns existing in the United States and Western Europe, a prominent feature of the country's ideology.

The main agents in the transfer of foreign tastes and ideas are the Venezuelan elites, including the educated people, who have close contacts with the big centers of advanced countries. The Venezuelan elites set consumption patterns for other social groups, which generally accept the 'desired model', therefore creating further demand, and supporting those industries which are able to produce:

- a. highly diversified products, following the appearance of the similar products in industrialized countries;
- b. high quality products necessitating the adoption of basically the same technologies as those used in advanced countries, with particular emphasis on capital-intensive techniques.

Because the local demand is very limited, the small scale of production affects costs and results in very high prices for final consumers. The prices are usually much higher than import prices for the same products (see Table 12). In other words the present consumption patterns promote development of too many small scale industries, as in automobile assembly, leading to too many models, which again are not able to compete with foreign producers because of lower efficiency.

Chossudovsky, looking at the same problem from a different perspective, argues that

the composition of production in manufacturing and the structure of consumer demand which it endorses, are conducive to an accentuation of income inequalities (Chossudovsky, 1978, p. 14).

Employment Problem

Relatively high unemployment remains one of the most important regional development problems in Venezuela, as the country continues to experience the very high rates of population growth. The rapid population growth and internal migration to urban centers as well as illegal immigration from other countries add an increased pressure on the country's labor market.

The Venezuelan unemployment rate varied from 10 to 14 per cent in 1960s, but in 1970s it apparently went down below the 10 per cent level. In 1978 the official unemployment rate was at 5 per cent for the whole economy and 5.3 per cent for the manufacturing sector (Anuario Estadístico, 1980, p. 92). This however should be interpreted very cautiously, for besides revealed unemployment, there exists a serious problem of hidden unemployment. The reliability of the official Venezuelan statistics may also be questioned. The Venezuelan Labor Organization - CTV (Confederación de Trabajadores Venezolanos) claims 15 per cent is a more realistic estimation of the Venezuelan unemployment rate. Chossudovsky suggests that the rate of unemployment in Venezuela was over 16 per cent in 1974 and argues that in the same year

less than 30 per cent of the total population belonged to the official labour force; close to half of the economically active population of more than 15 years of age is considered 'to be outside' the labour force. The percentage excludes 'official' unemployment of 6.2 per cent which is included in the labour force; thus approximately 55 per cent of the economically active population is without work. This figure does not pertain to those members of the labour force which are under-employed (Chossudovsky, 1978, pp. 7-8; see also Moscovitch, 1969, pp. 378-399).

High unemployment levels in Venezuela are blamed on an extensive use of capital intensive technologies with new investments creating very little employment (Hassan, 1975), in an economy which is believed to be 'labor abundant'.

In 1978 the manufacturing sector provided employment for only 16.8 per cent of the Venezuelan active labor force (Anuario Estadístico, 1980, p. 84). Within the manufacturing sector, the traditional industries are still the main employer, though their share has dropped from 50.05 per cent of the total industrial employment in 1971 to 44.77 per cent in 1977 (Table 17). Both the intermediate and mechanical industries have increased their relative shares in the total manufacturing employment, the former from 28.25 per cent in 1971 to 30.22 per cent in 1977 and the latter from 16.49 per cent in 1971 to 19.87 per cent in 1977, just suggesting that the employment within modern sector has grown at higher rates than job creating within the traditional industries.

It seems that the so called capital-intensive industries have been also more successful in generating higher incomes, as wages in modern sector have been significantly higher than those offered by the traditional

TABLE 17

EMPLOYMENT IN MANUFACTURING SECTOR

Sectors	1971	%	1977	%
Traditional Industries	121,320	50.05	187,891	44.77
Food	46,865	19.33	65,231	15.54
Beverages	9,123	3.76	13,206	3.15
Tobacco	2,704	1.12	3,574	0.85
Textiles	20,406	8.42	31,977	7.62
Clothing	16,205	6.69	31,137	7.42
Leather & Leather Products	2,233	0.92	3,689	0.88
Footwear	8,513	3.51	13,406	3.19
Wood Products	6,472	2.67	9,226	2.20
Furniture	8,799	3.63	16,445	3.92
Intermediate Industries	68,474	28.25	126,832	30.22
Pulp & Paper	7,994	3.30	13,468	3.21
Chemicals & Chemical Prod.	17,854	7.37	30,623	7.30
Petroleum & Coal Products	5,083	2.10	5,418	1.29
Rubber & Rubber Products	5,370	2.22	6,863	1.64
Plastic Products	4,723	1.95	13,466	3.21
Non-metallic Minerals & Prod.	16,457	6.79	31,051	7.40
Iron & Steel Industry	9,452	3.90	22,208	5.29
Non-ferrous Metals	1,541	0.64	3,735	0.89
Mechanical Industries	39,975	16.49	83,377	19.87
Metal Products	15,839	6.53	31,797	7.58
Machinery (excluding Electric)	3,568	1.47	11,890	2.83
Machinery & Electric Equip.	7,719	3.18	15,407	3.67
Motor Vehicle Industry & Transp.	12,849	5.30	24,283	5.79
Residual Group	12,627	5.21	21,578	5.14
Graphic Arts	8,636	3.56	14,741	3.51
Others	3,991	1.65	6,837	1.63
TOTAL	242,396	100	419,641	100

Source: calculations based on data from: 1. III Encuesta Industrial 1971 - CORDIPLAN, 1973
2. VII Encuesta Industrial 1977 - OCEI, 1980.

industries (see Table 18).

Despite its high unemployment, Venezuela suffers from a serious deficit of skilled labor and many industries have to rely on imported foreign labor. Tomlinson has noticed that

one authority (Cojuntura Economica Andina, 1976) has estimated that there is a deficit of at least 13,000 skilled workers each year (Tomlinson & Hills, 1978, p. 25).

The problem is even more serious. Hassan has argued that since the war the high rate of growth of modern industry based on advanced technology had not been associated with a similar modernization of the labor force... in addition to the slow development of general education, the lack of vocational training - and the poor facilities for the advancement of labor skills constitute another bottleneck in the economic development of Venezuela (Hassan, 1975, p. 94; see also Doutriaux & Osborne, 1980).

Indeed, the relatively low educational level of the entire population persists in the country. Close to 18 per cent of Venezuelans over 15 years old still cannot read or write and another 50 per cent has only elementary education (Table 19). At the same time approximately 5 per cent of the population has acquired some form of higher education, which may be below the University standards in advanced countries.

The present author's findings are confirmed by Street who points to

the weakness of the faculty structure of the universities and their concentration of restless students faced with crucial career decisions in an atmosphere of intellectual and economic frustration... (which has made) the universities and their associated research institutes objects of repeated and destructive political intervention... instead of being centers of learning they became hotbeds of political agitation

TABLE 18

COSTS OF LABOR (EARNINGS) PER EMPLOYEE
(in Bolivars)

SECTORS	1971	1977
Traditional Industries	12,693	22,535
Food	12,550	25,150
Beverages	18,692	30,919
Tobacco	17,473	29,442
Textiles	14,638	26,573
Clothing	10,693	18,064
Leather & Leather Products	13,474	18,428
Footwear	8,921	18,431
Wood Products	9,396	17,709
Furniture	10,737	18,096
Intermediate Industries	20,414	32,949
Pulp & Paper	16,929	28,994
Chemicals	20,557	34,894
Petroleum & Coal Products	49,432	53,684 (65,730)
Rubber & Rubber Products	16,893	31,727
Plastic Products	13,352	24,392
Non-metallic Minerals & Prod.	14,727	22,684
Iron & Steel Industry		33,779
Non-ferrous Metals	22,519	33,442
Mechanical Industries	15,316	25,896
Metal Products	13,030	22,823
Machinery (excluding Electric)	13,700	24,151
Machinery & Electric Equipment	14,902	25,277
Motor Vehicle Ind. & Transp.	18,819	31,334
Residual Group	16,050	25,163
Graphic Arts	17,702	29,873
Others	12,469	20,454
Total	15,488	26,635

Source: calculations based on data from: 1. III Encuesta Industrial 1971, CORDIPLAN, 1973.
2. VII Encuesta Industrial 1977, OCEI, 1980.

TABLE 19

VENEZUELAN LABOR FORCE - EDUCATIONAL LEVELS (1977 in Thousands of Persons)

Educational Level	Population	15 y.o. & over	Total	Active Population	Employed	Unemployed	Rate of Unempl.
Illiterates	1,300	(18%)	628	48.2%	608	20	3.0
No Formal Education	226	(3%)	129	56.9%	125	4	3.0
Primary	3,422	(47%)	2,046	59.8%	1,933	113	5.6
Secondary							
1 - 3rd yr	1,130	(16%)	511	45.3%	476	35	6.8
4th and more	499	(7%)	240	48.1%	227	13	5.4
Technical	101	(1%)	74	73.3%	70	4	5.6
General	99	(1%)	70	70.6%	69	1	1.3
Other	100	(1%)	59	53.4%	55	4	7.4
Higher Education	351	(5%)	224	63.9%	218	6	2.9
Not declared	3	(*)	0	8.3%	0	0	0
Total	7,231	(100%)	3,981	55.0%	3,781	200	5.0

Source: OCEI, Encuesta de Hogares (Caracas, 1977); Anuario Estadístico 1977, Caracas 1979, p. 80.

and rebellion. The clash of technological and institutional values is nowhere seen as clearly as it is in the present condition of higher education in Latin America (Street & James, 1978, pp. 487-488).

And finally contributing also to the employment problem, which affects growth of the manufacturing sector are high labor costs. In Venezuela market forces have been relatively weak in determining labor costs, which have been more influenced by other factors such as government policies and general labor attitudes. As a result the relatively rapid increases in earnings have often preceded the raising of labor productivity and therefore favoured capital-intensive technologies. (see Tarre Murzi, 1970).

Economic Use of the Venezuelan Space

Most of the authors concerned with the regional problems of Venezuela agree that the economic use of space in Venezuela has not been most favourable for the country's development (Friedmann, 1966 & 1977; Hassan, 1975; Allen, 1977, Chossudovsky, 1978; Negron, 1978; Rofman, 1978; Jones, 1978 and Travieso, 1972).

Santos suggests that in developing countries there is a different kind of space - 'espace derive' - which is a product of domination effects emanating from developed countries (Santos, 1975; also Walton, 1975). Pedrao claims that all Latin American countries

may not be making the best possible use of their economic space at the present time, or even the most suitable use from the point of view of achieving development aims, as now conceived, and particularly from that of improving the level of well being of the population and solving different social problems which are usually considered extremely grave (Pedrao, 1979, p. 63; see also Rofman, 1971).

The Venezuelan space economy is similar to that of other Latin American countries, being organized basically into one central region and a group of peripheral regions, which are producers of primary products (Friedmann, 1966 and Travieso, 1972). The problems created by such a spatial pattern are blamed by many authors on external factors (Richardson, 1975; Stöhr, 1975). To what extent the above is still true may be questionable, as internal factors play more important role in Venezuela's development today.

Within the country the 'center-periphery' spatial arrangement has been supported by both migration patterns and regional investment allocations which have favoured the central regions.

Migration Pattern

The Venezuelan migration pattern is characterized by one major center and two secondary ones which have attracted population from other parts of the country as well as foreign migrants (Map 2). The Federal District constitutes the core of the main center and it has continued to attract the largest numbers of local and foreign migrants (Table 20 & 21). In 1978, 17.70 per cent of the total Venezuelan population was living within a very small area of the Federal District, which represents only 0.21 per cent of the national territory (Table 22). Both the Capital Region and the Central Region had over 41 per cent of the country's population (Map 3 and Table 22). The second 'center of attraction' has been the Zulia Region with significant internal and foreign immigration (Table 20 & 21). In 1978 the Zulia State had 12.18 per cent of the total Venezuelan population (Table 22). Another secondary center has been created by the oil-rich region of two Eastern States: Anzoategui and Monagas (Map 1) though today the Guayana Region and the new industrial complex seems to be more attractive for many migrants.

The main reason behind the migratory movements in Venezuela has been job seeking, though natural and man-made amenities have also played

Map 2 : Migration Pattern, Main Centers of Attraction

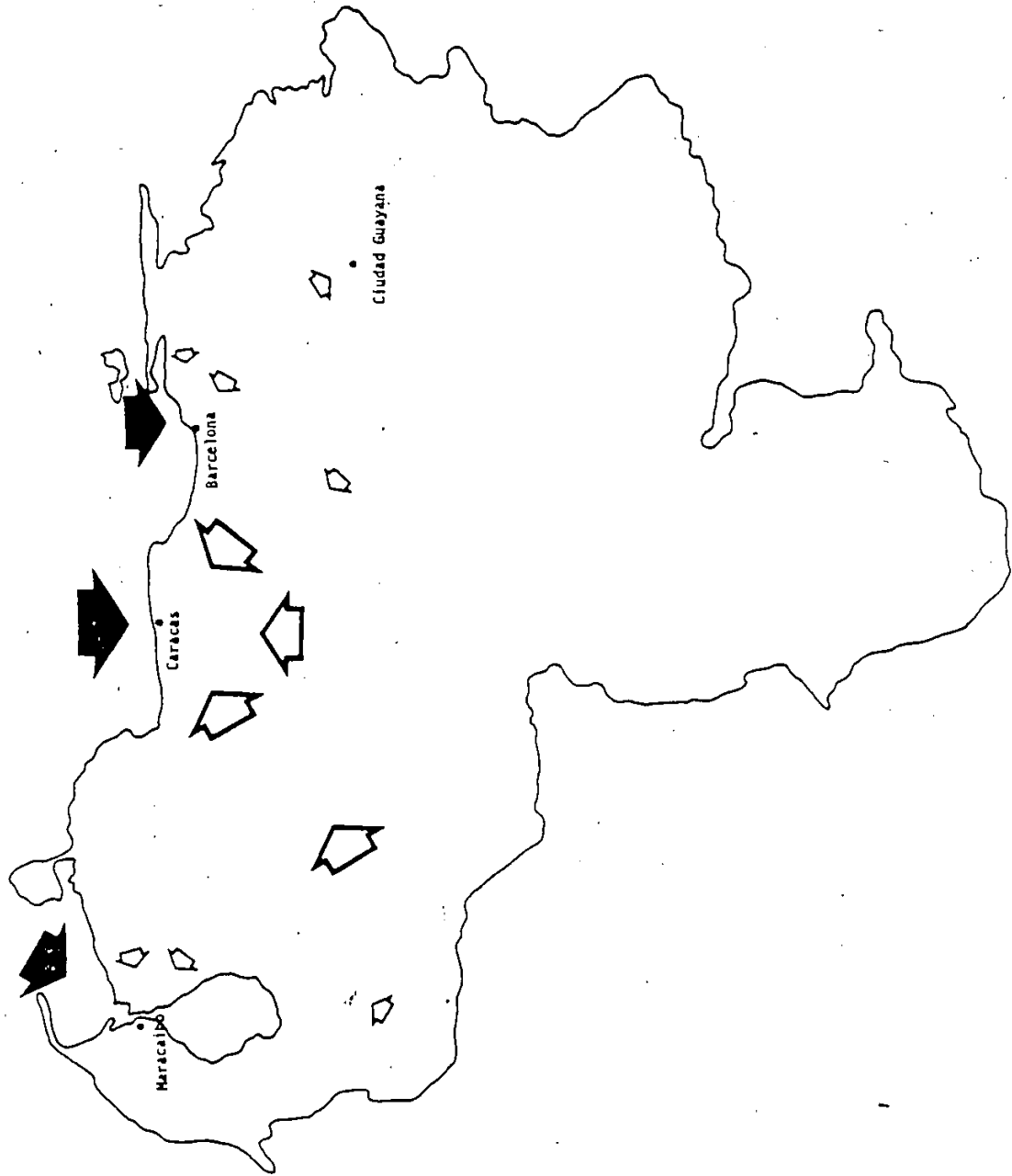


TABLE 20

INTERNAL AND FOREIGN MIGRATION, VENEZUELA, 1936-1950 (in thousands)

Province and Region	Out- Migration (1)	In- Migration (2)	Net Internal Migration (3)	Foreign Immigration (4)	Total Immigration (3 & 4) (5)
Western Oil States	<u>57</u>	<u>95</u>	<u>38</u>	<u>17</u>	<u>55</u>
Zulia (Z)*	15	90	75	14	89
Falcon (Ce)	42	5	-37	3	-34
Mountain States	<u>119</u>	<u>17</u>	<u>-102</u>	<u>16</u>	<u>-86</u>
Tachira (A)	32	7	-25	13	-12
Mérida (A)	32	4	-28	1	-27
Trujillo (A)	55	6	-49	2	-47
West Central States	<u>76</u>	<u>14</u>	<u>-62</u>	<u>6</u>	<u>-56</u>
Lara (C-W)	48	12	-36	4	-32
Yaracuy (C-W)	28	2	-26	2	-24
East Central States	<u>112</u>	<u>274</u>	<u>161</u>	<u>106</u>	<u>268</u>
Carabobo (Ce)	21	24	3	7	10
Aragua (Ce)	18	28	10	5	15
Miranda (C)	45	30	-15	17	2
Federal District (C)	28	192	164	77	241
Llanos	<u>45</u>	<u>43</u>	<u>-2</u>	<u>8</u>	<u>6</u>
Barinas (A)	7	7	0	1	1
Portuguesa (C-W)	4	24	20	2	22
Cojedes (Ce)	7	1	-6	1	-5
Apure (S)	11	2	-9	2	-7
Guarico (Ce)	16	9	-7	2	-5
Eastern Oil States	<u>29</u>	<u>79</u>	<u>50</u>	<u>8</u>	<u>58</u>
Anzoategui (N-E)	11	49	38	7	45
Monagas (N-E)	18	30	12	1	13
East Coastal States	<u>69</u>	<u>2</u>	<u>-67</u>	<u>1</u>	<u>-66</u>
Sucre (N-E)	55	0	-55	1	-54
Nueva Esparta (N-E)	14	2	-12	0	-12
Guayana	<u>25</u>	<u>8</u>	<u>-17</u>	<u>3</u>	<u>-14</u>
Bolívar (G)	18	7	-11	1	-10
T.F. Delta Amacuro (G)	6	1	-5	1	-4
T.F. Amazonas (S)	1	0	-1	1	0
VENEZUELA	<u>532</u>	<u>532</u>	<u>0</u>	<u>165</u>	<u>165</u>

Source: Friedmann, 1966, p. 141

* Z = Zulia Region
 Ce = Central Region
 C-W = Central Western Region

C = Capital Region
 N-E = North Eastern Region
 A = Andes Region

G = Guayana Region
 S = Southern Region

TABLE 21

POPULATION OF VENEZUELA BY REGIONS & MIGRATIONS

	1950		In Thousands		1974		Growth Rates		1950/71	Migrations	
	%		%	1971	%	1974	%	1950/61			61/71
Capital (C) *	19.6	1,751	23.3	2,717	25.3	2,975	25.5	5.35	4.49	4.94	557,922
Central (Ce)	12.9	1,013	13.4	1,616	15.1	1,978	15.4	4.13	4.78	4.44	187,919
Centro Occid. (C-W)	17.5	1,209	16.1	1,599	15.1	1,725	14.8	2.91	2.84	2.87	-219,476
Zulia (Z)	11.1	920	12.2	1,299	12.1	1,412	12.1	4.62	3.51	4.09	71,334
Los Andes (A)	17.6	1,156	15.4	1,506	14.0	1,582	13.5	2.47	2.68	2.57	-375,817
Sur (S)	2.0	126	1.7	179	1.6	200	1.7	2.22	3.57	2.86	- 33,679
Nor Oriental (N-E)	16.4	1,119	14.9	1,392	12.9	1,497	12.8	2.79	2.21	2.51	-283,231
Guayana (G)	2.9	230	3.0	413	4.1	479	4.1	4.22	6.03	5.08	45,025
Total	100.0	7,524	100.0	10,721	100.0	11,632	100.0	3.72	3.60	3.68	

* See Table 20

Source: Maritza Inzaguirre P., 1977, pp. 74 - 76; Ministerio de Fomento, Direccion General de Estadistica y Censos Nacionales, Censos de 1950, 1961 y 1971 y estimaciones para 1974.

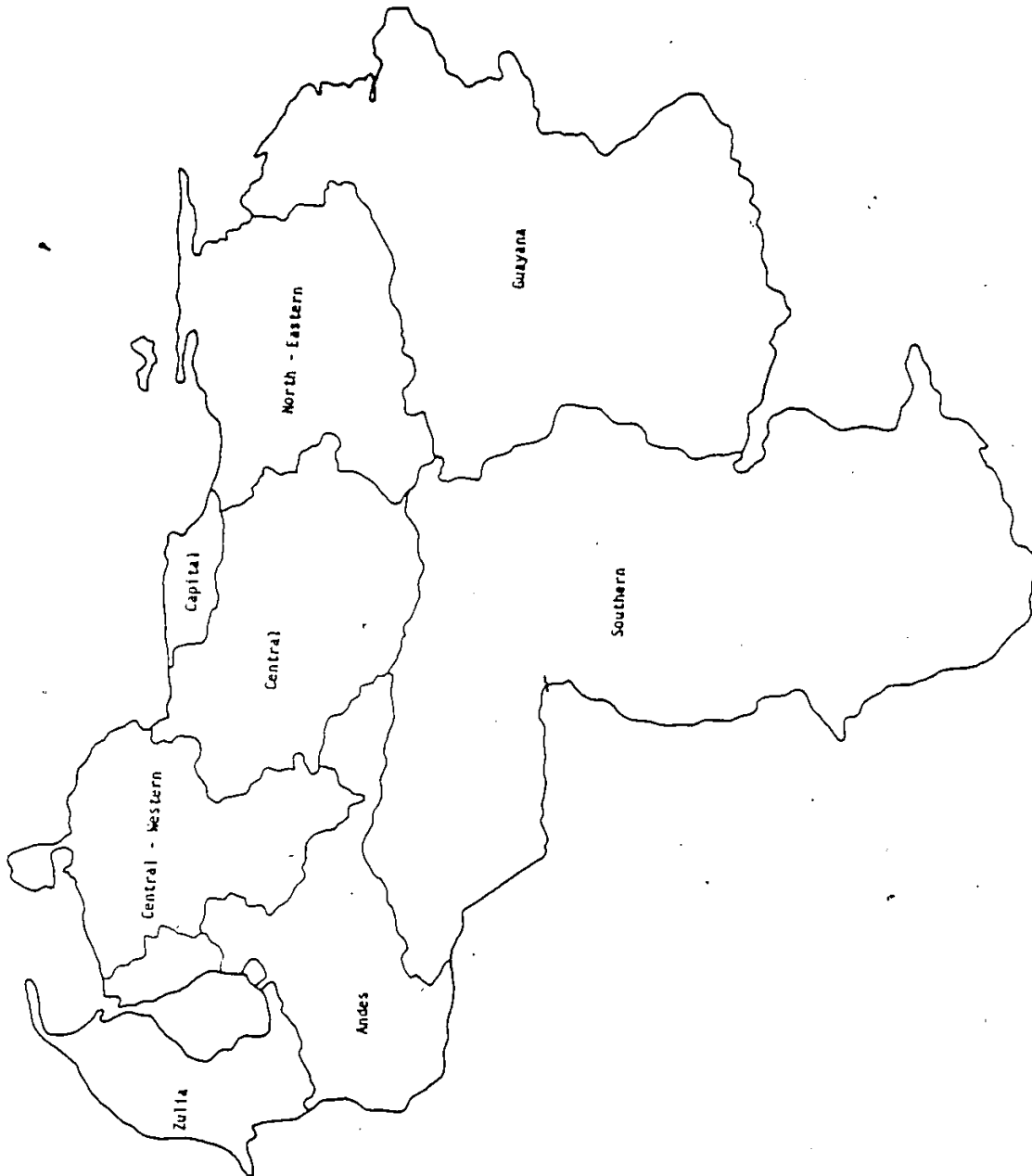
TABLE 22

DISTRIBUTION OF VENEZUELAN POPULATION

	Area (Z)	1974	Z	1978	Z
Distrito Federal (C)	0.21	2,035,896	17.50	2,322,209	17.70
Anzoategui (N-E)	4.75	548,244	4.71	616,518	4.70
Apure (S)	8.39	177,474	1.53	198,280	1.51
Aragua (Ce)	0.77	593,853	5.11	676,117	5.15
Barinas (A)	3.86	252,013	2.17	285,990	2.18
Bolivar (G)	26.09	428,366	3.68	487,634	3.72
Carabobo (Ca)	0.51	720,320	6.19	819,380	6.24
Cojedes (Ce)	1.62	101,664	0.87	113,629	0.87
Falcon (C-W)	2.72	437,996	3.77	486,954	3.71
Guarico (Ce)	7.12	344,408	2.96	386,061	2.94
Lara (C-W)	2.17	724,201	6.23	810,851	6.18
Merida (A)	1.24	372,776	3.20	415,421	3.17
Miranda (C)	0.87	938,718	8.07	1,074,236	8.19
Monagas (N-E)	3.17	320,661	2.76	357,452	2.72
Nueva Esparta (N-E)	0.13	127,557	1.10	142,075	1.08
Portuguesa (C-W)	1.67	322,857	2.78	364,847	2.78
Sucre (N-E)	1.29	500,275	4.30	552,301	4.21
Tachira (A)	1.22	549,594	4.72	612,762	4.67
Trujillo (A)	0.81	406,843	3.50	449,710	3.43
Yaracuy (C-W)	0.78	240,238	2.07	267,835	2.04
Zulia (Z)	6.92	1,412,852	12.15	1,598,631	12.18
T.F. Amazonas (S)	19.27	23,477	0.20	26,369	0.20
T.F. Delta Amacuro (G)	4.41	51,367	0.44	56,690	0.43
Total	100.00	11,631,650	100.00	13,121,952	100.00

Source: calculations based upon data from OCEI, Anuario Estadístico 1978, Caracas, 1980, p. 7 & 23.

Map 3 : Venezuela : Administrative Regions



an important role especially in the growth of the capital city - Caracas.

Jones has claimed that

there is an anti-rural, pro-urban bias in Latin America which influences migration with only partial regard for actual opportunities found in either type of place (Jones, 1978, p. 89; see also Chi-Yi Chen, 1968).

As a consequence the population of Caracas has increased from 92,000 in 1920 to almost 500,000 in 1950; 1,400,000 in the early 1960s and over 2,000,000 in 1970s (Friedmann, 1966, pp. 134-136 and Anuario Estadístico, 1979 & 1980).

The national capital has built its dominant position over the rest of the country because of the complex external and internal factors which have favoured its development. The rapid growth of Caracas has had some 'spread' effects over the surrounding areas. The Venezuelan center today includes also the cities of Maracay, Valencia and the ports La Guaira and Puerto Cabello, all in close geographical proximity to the capital city. The majority of other urban centers in Venezuela have developed on the basis of predominantly extra regional demand, both national, to satisfy mainly the growing demand of the central region and international, through exports of basic raw materials to industrialized countries. Such an urban pattern would correspond to two theoretical concepts of development 'from inside' and development 'from outside', as defined by Hilhorst (1971) and Stöhr (1972), with

impulses transmitted from the main metropolitan centre downwards to the intermediate and small cities (which) are principally innovation and power, while those transmitted from the small cities upwards to the main metropolitan centres are

principally labour, capital and natural resources (Stöhr, 1975, pp. 167-169).

Spatial Concentration of Manufacturing

The national capital has become the predominant seat of the country's economic activities. Foreign and local investors have favoured the central region and particularly the Federal District because of the already existing market, basic infrastructure, more qualified labor, external economies and close contacts with local authorities. The center has attracted consequently over 60 per cent of total industrial investment in Venezuela, 67.24 per cent in 1974, compared with 69 per cent in 1936 and over 90 per cent in 1964 (Table 23).

The economic use of space in Venezuela has been influenced not only by private decision makers but also by government intervention and involvement, which have significantly increased over recent years. In 1978 public investments in the manufacturing sector reached Bs 6,213 million (Anuario Estadístico, 1980, p. 375). According to Friedmann

Venezuela's unitary form of government proved to be of exceptional advantage for the further growth of the central regions. Not only did public investments almost continuously favour the central area, particularly Caracas, but many private entrepreneurs found proximity to government offices a decisive element in location decisions (Friedmann, 1969, p. 48).

In recent years the central regions have managed to maintain

TABLE 23

INDUSTRIAL INVESTMENTS BY REGIONS (PERCENTAGE OF TOTAL)

	1936	1960	1964	1968	1974
Center (including Federal District)	69.0	74.3	90.3	61.1	67.24
Zulia Region	8.0	21.9	4.2	21.1	6.40
Rest of the Country	23.0	3.8	5.5	13.8	26.36
(Guayana)					(15.40)

Source: 1. Travieso, 1972;

2. IV Encuesta Industrial, 1974, OCEI, 1976.

and even strengthen their privileged position among other regions of the country. In 1974 the Capital Region had 51.78 per cent of the country's industrial units, 45.76 per cent of the manufacturing employment and its production constituted 28.27 per cent of the gross production value of manufacturing and 34.55 per cent of the value added (Table 24). In the period 1971-1974 both gross production value and the value added of the manufacturing sector in the Capital Region have diminished their national contribution to the advantage of other regions, though this could have been caused by changing prices and particularly rapid increases in oil prices. The Central Region had another 17 per cent of the country's industrial units in 1974 and accounted for 30.18 per cent of the industrial employment, 29.65 per cent of the gross production value and 33.97 per cent of the value added of the Venezuelan manufacturing (Table 24).

While other regions, such as the Central-Western Region generate high incomes, their contribution to the creation of new employment has decreased, as the Capital Region and the Central Region accounted for almost 76 per cent of the national manufacturing employment. Only the Guayana Region increased its share from 3.6 per cent to 4.02 per cent in the period 1971-1974.

While concentration of manufacturing and employment in the central regions confirms the existence of the 'center-periphery' spatial structure in Venezuela, the persistence of such a model in the future may be less likely, as significant changes in regional production structures have already occurred.

TABLE 24

ECONOMIC VARIABLES AT REGIONAL LEVEL (VENEZUELA 1971 and 1974) - Percentage Distribution

Regions	Industrial Units		Gross Production		Value Added		Fixed Capital		Employment	
	1971	1974	1971	1974	1971	1974	1971	1974	1971	1974
Capital Region	51.3	51.78	35.1	28.27	41.6	34.55	20.9	23.98	45.6	45.76
Central Region	16.3	17.41	30.0	29.65	32.4	33.97	28.4	30.47	29.0	30.18
Centro-Occidental Region (Central-Western)	8.2	7.22	18.2	28.49	7.8	13.55	21.2	10.70	6.9	6.48
Zulia Region (Zulia Region)	8.0	8.64	7.5	5.69	7.8	6.22	4.9	5.49	6.4	6.06
Los Andes Region (Andes Region)	6.9	6.42	1.8	1.49	1.7	1.85	2.3	1.90	3.5	3.24
Apure Region (Southern Region)	0.4	*	0.1	*	0.1	*	0.1	*	0.1	*
Nor Oriental Region (North Eastern)	6.6	5.90	4.2	2.84	4.5	3.86	4.4	5.05	4.9	4.26
Guayana Region	2.3	2.63	3.1	3.59	4.1	6.00	17.8	22.42	3.6	4.02
Total	100	100	100	100	100	100	100	100	100	100

Source: calculations based on data from: 1. III Encuesta Industrial 1971 - CORDIPLAN (Caracas, 1973)

2. IV Encuesta Industrial 1974 - Direccion General de Estadistica y Cen. Nac. (Caracas, 1976).

* Apure Region - less than 1 per cent.

Another economic indicator, regional incomes, favours again the center, which has more equal distribution of family incomes. The Capital Region has also higher incomes than other regions (Table 25).

TABLE 25

DISTRIBUTION OF FAMILY INCOMES BY REGIONS (Urban Centers)

Monthly Incomes (in Bs)	Total National	Capital Region	Central Region	Centro-Occidental Region	Zulia Region	Andina Region	Nor-Oriental Region	Guayana Region
0 - 500	23.1	12.9	23.7	35.7	27.9	36.2	35.0	26.6
501 - 1,000	30.5	28.7	33.3	31.5	31.0	29.2	31.7	32.0
1,001 - 1,500	17.1	18.9	17.7	14.0	17.2	12.9	14.7	17.4
1,501 - 2,000	9.6	11.8	9.1	7.2	8.3	7.5	6.8	9.0
2,001 - 3,000	9.4	12.5	8.5	6.6	7.5	6.7	6.6	7.8
3,001 - 4,000	4.7	6.5	3.8	2.6	4.0	3.9	3.0	3.3
4,001 - 5,000	2.4	3.5	2.0	1.2	1.7	1.6	1.2	1.9
5,000 and more	3.2	5.2	1.9	1.2	2.4	2.0	1.0	2.0

Percentage

Distribution of the Urban Population (Percentages)

100 40.1 14.3

Rates of Growth of Population

5.2 6.6 5.5 4.1 3.1 3.7 3.7 12.7

Source: MERCAVI - 70 - Estudio del mercado real de la vivienda en Venezuela, Caracas, 1971

also M. Chossudovsky, 1977, p. 209.

Conclusion

The regional problems in Venezuela require that actions be taken at the national as well as regional level, as there is a significant interdependence between regional and national development.

The government's intervention is increasingly felt in all sectors of the Venezuelan economy but it does not mean that its actions have always positive effects upon the growth of the country's economy. In fact more intervention may be needed to correct previous policies. The government remains motivated by the prevailing 'ideology' and political factors often dominate over economic reasoning. However, the country's 'ideology' does not appear very helpful in offering solutions to development problems.

Venezuela needs to diversify its economy to reduce the overdependence on one sector, oil, which has been the main source of national incomes, but also has often limited the growth of other industries. The expansion of the Venezuelan manufacturing sector has been too slow to bring in necessary structural changes in the national and regional economies. Yet, future growth of manufacturing industries and services offer new hopes for diversification of the country's economy and absorption of large amounts of labor.

The Venezuelan spatial model represents the typical 'center-periphery' arrangement. It has been supported by the migration and investment patterns and additionally strengthened by the government policies.

The existing model is unfavorable not only for the 'periphery' but also for the further growth of the central regions.

Only development agents through new investments in less developed regions can gradually change the excessive concentration of population and economic activities in the 'center'.

Despite the superficial embellishments of polemic rhetoric - there exists in the country an almost complete consensus on what has to be done and what the nation is asking with pressing urgency of the present Venezuelan generation (J.Friedmann)

CHAPTER IV

TOWARDS SYNCHRONIZED GROWTH IN VENEZUELA'S REGIONAL DEVELOPMENT

Initiating Synchronized Growth

In its approach to regional development during recent years Venezuela has come closer to a synchronized growth strategy than many other countries since it has already introduced certain measures which promote this type of development strategy. The country has succeeded at least in three fields which are essential for the implementation of the proposed strategy :

- a. creation of new development agents,
- b. initiation of synchronization processes, and
- c. expansion of economic space.

The central role in regional development has been played by new development agents which have been also responsible for promotion of synchronization processes and the enlargement of the economic space of the country and its regions.

New Institutions: CORDIPLAN

A key agent has been CORDIPLAN - the Government Planning Agency, which was created in 1958 and charged with the preparation of a first development plan to optimize the country's use of human and natural resources and ensure harmonious and balanced growth. CORDIPLAN had the following goals:

- a. diversification of the production structure and reduction of the heavy dependence of the Venezuelan economy on oil;
- b. creation of new employment opportunities, as high rates of unemployment were regarded as a major development problem;
- c. better distribution of personal and regional incomes;
- d. raising of the standards of living of the entire population

(Izaguirre, 1977, pp. 11-12 & Decreto 108; 31/07/1959).

It was not however the introduction of planning in Venezuela that was crucial for the achievement of the above goals, as CORDIPLAN had no share in the decision-making process and all plans were indicative in relation to the private sector. The success of the new development agent required an initiation of synchronization processes. CORDIPLAN had to coordinate the planning processes of other government agencies and to cooperate with the private sector. Both functions were very difficult, at first as has been noticed by Hassan

the long established administrative structure, into which CORDIPLAN was being fit, had its vested interests that resisted change... traditionally, the various ministries and institutions were independent agencies, each responsible for defining and executing its own program. Consultation and cooperation were kept at a minimum and interference of one agency in the affairs of another was not tolerated (Hassan, 1975, pp. 115-116).

On the other hand private capital, both local and foreign, has been very suspicious about the government's intervention into its 'own domain' and it has been reluctant to make any step towards some form of private-public collaboration.

Because of those limitations CORDIPLAN's role in regional development has been seriously curtailed and its major contribution lies in formulation of the country's development plans, definition of regional objectives and initiation of some harmonization of interests and cooperation at the government level, including different commissions and establishment of small CORDIPLANs at the level of ministries (see Brons, 1965).

Industrial Policies

The nation's development strategy has been based on rapid expansion of the manufacturing sector. The dominating 'ideology' has also favoured industrialization over agriculture, the former meant progress while the latter was a symbol of underdevelopment.

The negative effects of the import substitution strategy has led to the revision of the country's industrial policies by CORDIPLAN.

Venezuela has realized that it needed not only more industrial growth, but first of all a different industrial structure which would assure the more efficient use of the country's resources.

Industrial policies defined in the Vth National Plan 1976-80 promoted further import substitution industrialization but at the same time more attention was given to 'export substitution', which is the substitution of primary export industries by domestic manufacturing industries (see Myint, 1972). The development plan called for creation of modern basic and intermediate industries which would use local raw materials and therefore give Venezuela comparative advantage over its foreign competitors. The concept of comparative advantage was used in its traditional interpretation based on the country's factor endowments.

The total investment over the five-year period 1976-1980 was to reach almost Bs 224 billion of which Bs 118.78 billion was to be public and Bs 104.95 billion private (Table 26 & Anuario Estadístico, 1980).

The government has placed particular emphasis on a few selected sectors such as oil sector which was to receive 19.80% of total funds, manufacturing another 19.36% of total investments, energy program - 14.88% and transportation and communication - 14.21% of total (Table 26).

Within the manufacturing sector the steel industry and aluminum industry were to absorb a major part of the public capital investment. The steel industry accounted for 67.13 per cent of total public funds in the manufacturing sector and aluminum was to receive 24.28 per cent in 1976-1980. Beside the above two industries, the government's manufacturing investments

TABLE 26

PLANNED PUBLIC INVESTMENT 1976-1980 (Vth NATIONAL PLAN) - in Millions of Bolivars

	1976	1977	1978	1979	1980	1976-80
1. Agriculture	1,428	1,537	1,695	1,885	1,660	8,250
2. Mining	420	285	155	110	60	1,030
3. Oil Sector	2,464	4,291	5,620	6,137	5,008	23,520
4. Manufacturing	6,020	8,501	3,816	2,782	1,776	22,895
Steel	3,800	5,550	2,050	2,320	1,650	15,370
Sidor Plan IV	3,800	5,500	2,000	2,270	1,600	15,170
Zulia Project	-	50	50	50	50	200
Aluminum	1,610	2,317	1,319	314	-	5,560
Venalum	470	1,115	749	226	-	2,560
Aluminio del Caroni	335	265	-	-	-	600
Alumina & Assoc. Proj.	805	937	570	88	-	2,400
Automobile & Mechanical Industry	196	220	116	27	6	565
Tractors and Engines	-	24	18	27	6	75
Mechanical Complex	196	196	98	-	-	490
Petrochemicals	-	100	100	1,300	1,500	3,000
Shipbuilding	166	189	145	50	50	600
5. Electric Energy	2,196	2,779	3,438	4,090	5,174	17,677
Electrification del Caroni	531	716	1,758	2,421	2,741	8,167
C.A.D.A.F.E.	1,665	2,063	1,680	1,669	2,433	9,510
6. Transport & Communication	3,355	3,901	3,304	3,294	3,027	16,881
7. Housing	1,170	1,560	2,340	2,340	2,340	9,750
8. Education	800	800	800	300	300	3,000
9. Health	600	600	500	300	250	2,250
10. Other	1,833	2,081	2,332	2,134	2,189	10,569
Total	20,286	26,435	24,100	24,100	24,672	118,777
						100.00 %

Source: calculations based on data from V Plan de la Nacion 1976-1980, Caracas, pp. 72-75

were to be concentrated in petrochemicals, shipbuilding, automobile and mechanical industries.

The diversification of the country's production structure has required enormous investments in SOC (social overhead capital), and the private sector seemed less willing to bear such a heavy burden on its own thus waiting for the government's initiative. At the same time Venezuelan planners were looking for alternative energy sources such as new hydro-electric projects which needed even more capital. As a consequence the government's investments in SOC and related projects have significantly outpaced the planned figures in the first three years of the Vth National Plan - 1976, 1977 and 1978, while public spending in the manufacturing sector has lagged behind the planned levels (Tables 27 & 28). For example in 1976 the government was to spend Bs 6,020 million on the new industrial projects, while in reality its investments reached only Bs 4,216 million (Tables 26 & 27).

International Synchronization Processes :

Andean Pact

The dissatisfaction with the state of national and regional development has drawn more attention to the possibility of international cooperation to deal with development problems. The feelings of 'dependency' and domination from outside were strong in Venezuela as in the rest of Latin America. It was mainly foreign capital which has remained a symbol of dependency and exploitation. At the same time attempts to control invest-

TABLE 27

PUBLIC AND PRIVATE INVESTMENT IN VENEZUELA 1974-1978 (Millions of Bolivars)

	1974		1975		1976		1977		1978	
	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private
Agriculture	435	1,086	798	1,862	982	1,443	863	2,014	892	1,744
Mining	1	25	37	49	132	74	229	95	196	67
Oil Sector	377	1,583	443	767	1,114	-	2,072	-	3,824	-
Manufacturing	933	1,946	1,770	2,282	4,216	2,855	5,991	@	5,007	@
Electricity & Water	1,281	221	1,901	295	2,859	568	5,505	994	6,711	1,032
Transport & Communication	1,335	666	2,226	755	3,051	1,237	5,006	1,298	5,360	1,997
Social Services	1,087	@	3,817	@	2,259	@	2,251	@	3,327	@
Commerce, Restaurants & Hotels	144	1,015	12	1,299	35	1,509	105	@	121	@
Other										
Total	6,808	14,176	12,533	18,065	17,597	25,050	23,663	36,764	29,587	38,691
TOTAL (Pub & Pr)	20,984		30,598		42,647		60,427		68,278	
National	14,369		20,105		27,693		36,750		45,007	
Imported	6,615		10,493		14,954		23,677		23,271	

@ Not available

Source: Calculations based on data from: 1. Banco Central de Venezuela, Informe Economico 1978
2. Anuario Estadistico 1978, Caracas, 1980.

TABLE 28

GOVERNMENT EXPENDITURES BY CATEGORY
(in Millions of Bolivars)

	1970	%	1974	%	1978	%
Services	823	7.99	1,668	4.16	6,572	11.48
General Administration	456	4.43	819	2.04	4,327	7.56
Foreign Affairs	75	0.73	387	0.97	375	0.65
Public Order & Security	258	2.51	378	0.94	1,729	3.02
General Research	34	0.33	84	0.21	141	0.25
Defense	898	8.72	1,944	4.85	3,894	6.80
Social	3,314	32.19	7,339	18.32	19,685	34.37
Education	1,632	15.85	3,783	9.44	8,636	15.08
Sanitation	767	7.45	1,283	3.20	3,834	6.69
Social Security	426	4.14	643	1.61	3,754	6.56
Housing	423	4.11	1,467	3.66	2,735	4.78
Other	66	0.64	163	0.41	726	1.27
Economic	3,452	33.53	12,293	30.69	18,222	31.82
Administration & Research	128	1.24	108	0.27	204	0.36
Agriculture & Fishing	1,088	10.57	4,381	10.94	3,697	6.46
Mining, Manufacturing & Const.	656	6.37	4,241	10.59	2,421	4.23
Electricity, Gas & Water	325	3.16	1,234	3.08	5,509	9.62
Roads	791	7.68	1,381	3.45	3,445	6.02
Coastal & Internal Waterways	148	1.44	225	0.56	39	0.07
Other Transport & Communication	313	3.04	636	1.59	2,698	4.71
Other Economic Services	3	0.03	87	0.22	209	0.36
Other Expenditures	1,808	17.56	16,815	41.98	8,894	15.53
Interest on Pub. Debt.	166	1.61	205	0.51	2,068	3.61
Repayment of Public Debt	146	1.42	537	1.34	1,282	2.24
Administrative Debt	31	0.30	51	0.13	146	0.25
Acquisition of Financial Assets	26	0.25	58	0.14	5,298	9.25
Export Finance Fund.	-	-	-	-	100	0.17
Others	1,439	13.98	15,913 [@]	39.72	-	-
Total	10,295	100	40,059	100	57,267	100

Source: calculations based on data from:

1. Anuario Estadístico 1978, Caracas 1980
2. Informe Económico 1974, BCV
3. Anuario Estadístico 1970 & 1974

[@] includes FIV (Venezuelan Invest. Fund) - 13,000 (32.45%)

ments by a single country have proven very ineffective as foreign capital simply moved to countries offering more favourable conditions. International cooperation and coordination of interests was needed to change that situation.

Venezuela has initiated limited synchronization processes at the international level by joining in cooperation with countries belonging to the Andean Pact. Wriggins and Adler-Karlsson have argued that

the Andean Pact, it was hoped, would prevent outside capital seeking investment opportunities from playing off one country's terms against those of its neighbours, to the disadvantage of all but the potential investor. It even attempted briefly to allocate different types of industrial investment to particular countries, to avoid overinvestment in any one of the small national markets (Wriggins & Adler-Karlsson, 1978, pp. 56-57; see also Fontaine, 1977).

Morawetz has discussed the efforts by Andean countries to coordinate their economic policies and claimed that

the benefits from harmonizing economic policies can generally be expressed in terms of the increased regional economic efficiency attained; the major cost is the loss of local control over the policy instrument to be harmonized ... Harmonization of planning and macroeconomic policies may be taken to mean the institution of some degree of coordination in national development plans and stabilization policies (Morawetz, 1974, p.26 & p.43).

For some Andean countries, because of their national socio-political goals, the costs of such harmonization may be found too high to encourage multi-rateral cooperation (*ibid.*, 1974).

One of the most attractive projects approved by the Andean Pact

is multilateral sectoral planning. However, as noted by Fontaine

Unfortunately, the SPID (sectoral programs of industrial development) idea, so attractive on paper has not worked out so well in practice (Fontaine, 1977, p. 17).

There are many reasons for failure of this type of cooperation. These include the competitive character of the national economies of the Andean countries, lack of adequate information on factor endowments and comparative advantage of various regions, prolonged negotiations and opposition from the part of local firms, institutional weaknesses of the Pact, as well as the questionable economic efficiency of a sectoral approach forced upon the regional systems by the governments of member countries (see Morawetz, 1974; Fontaine, 1977; & Wengel, 1980).

Unfortunately, the Andean Pact though promoting limited harmonization of interests and actions among the member countries, may at the same time seriously limit cooperation with the outside world, as it supports unilateral actions versus other countries.

The Andean Pact has a strong backing of more radical trends in development theory and its open hostility towards foreign capital has been evident since its very creation (Council of the Americas, 1973; Pike, 1977). At the same time the Andean nations are not against multinational enterprises which would be owned and operated by their regional investors. Article 38 of the Cartagena Agreement allows for creation of MNCs to strengthen the economic position of the Region :

a multinational enterprise was defined as one in which 60% of ownership and control was held by nationals of the Andean countries, providing also that each of the five countries owned no less than 15% of the stock outstanding (Milenky, 1973, p. 58).

Decision 24 adopted in 1970 was directed against foreign ownership and it was based on the idea of 'divestment policies' propagated, among others, by Hirschman who has claimed that

a selective liquidation and withdrawal of foreign investment is in the best mutual interests of Latin America and the United States (Hirschman, 1969, p. 9),

although there is no clear evidence to support such a conclusion, except for political reasons. 'Divestment policies' have been criticised recently by Fayerweather, as they tend to discourage foreign investments by running counter to the MNC's interests and long-term strategies:

it appears that the fade-out approach is even less favourable than an immediate requirement to divest majority ownership. In the fade-out there is a distinct possibility of an extended period in which the MNC management will be treating the affiliate as a step-child, withdrawing earnings from it and not putting new effort into it (Fayerweather, 1978, p. 421).

Decision 24 set very strict conditions for foreign capital:

- a. foreign subsidiaries were offered a three-year period to convert to 'mixed companies', defined as companies where national ownership ranged from 51 to 80 per cent; if they wanted to benefit from lower tariffs and other privileges, such as access to local sources of long term credit;
- b. no new foreign investments were allowed in restricted sectors such as transportation, communication, banking, insurance and other public

utilities;

- c. existing companies in the restricted sectors were given the same three-year period to convert to 'national companies', defined as those companies where over 80 per cent of their capital belongs to national investors;
- d. all new investors were obliged to convert to either 'mixed or national companies over a 15-year period;
- e. foreign owned companies which export 80 per cent and more of their output were not subject to the above regulations.

(Decision No. 24 of the Cartagena Agreement Commission, 1970).

It comes as no surprise that MNCs were not in favour of the new regulations. According to the Harvard survey

thus Decision 24 is seen by most (MNCs) as a polemic - a strong declaration of control over foreign investments which will make headlines, boost national pride, give vent to nationalistic desires for power and control over their own destinies, and solidify the power bases of various political leaders (A Survey of Twenty Corporations, 1971, p. 57).

The new restrictions were criticized on the grounds that they would increase bureaucracy and diminish foreign investments in the Andean countries. The surveyed corporations have argued that also import of modern technologies will be circumscribed. Most of the MNCs believed however that Decision 24 would never be strictly and consistently enforced (ibid., p. 64).

Venezuela has tried to follow strictly the Decision 24 recommendations and introduced its own laws and regulations which were to carry out the spirit of the Andean Pact's agreement. Two main Decree Laws, 63 & 64

were announced by the Venezuelan government in 1974 and they defined the precise conditions for approval of new foreign investments, transfer of technology and repatriation of profits. In 1977 new Decree Law 2031 excluded foreign capital from investing in certain sectors reserved for national investors exclusively. Authorization for all new investments had to be obtained from a new government agency - Superintendency of Foreign Investments (Superintendencia de Inversiones Extranjeras /SIEX/) which was charged with:

- a. examining for approval all requests for foreign investments;
- b. examining for approval all contracts for the transformation of foreign enterprises into 'national' or 'mixed companies';
- c. authorizing contracts for the importation of technology, trade names, patents, licences and royalties;
- d. keeping a record of all foreign investments in the country and reporting on them periodically to the President (VBO, 1976, p. 113).

Most of SIEX' decisions are left to the 'free' judgement of the Executive, who are supposed to base their opinions on whether or not a concrete project contributes to the country's development goals such as generation of employment, promotion of regional growth and transfer of 'appropriate' technologies (SIEX, 1976). In most cases SIEX lacks sufficient experience and is confronted by too great uncertainty to make 'rational decisions' which might significantly change the existing investment patterns.

The implementation of Decision 24 seems to be more rigid in Venezuela than in other Andean countries (see Table 29). There are also

TABLE 29

OFFICIALS EVALUATIONS OF GOVERNMENTAL IMPLEMENTATION
OF DECISION 24 (governmental and private sector
responses)

Number of respondents describing
their government's implementation of Decision
24 as

	Number of respondents	Rigid (2)	Problematical (1)	Mean
Bolivia	8 (3)	2 (2)	3 (1)	1.50
Colombia	10 (3)	6 (3)	1	1.90
Chile	2 (0)	0	2	1.00
Ecuador	9 (3)	4 (3)	2	1.11
Peru	15 (5)	10 (3)	0 (2)	1.86
Venezuela	4 (1)	4 (1)	0	2.00

Mean = 1.56

Standard Deviation = .429

* - numbers in brackets represent private sector responses

Source: Ferris, 1979, p. 59

differences in interpretation of the new regulations:

Venezuela interprets the fifteen year period to imply a fixed date (i.e. 1989) by which all investment will conform to the minority shareholding formula. Colombia on the other hand, interprets the provision to mean that any firm will have a fifteen year period from the initial date of investment to convert their capital holdings (Tomlinson & Hills, 1978, p. 16).

The Venezuelan government strongly supports the 'divestment' process also through credit policy, by refusing long-term credits from public sources to those companies which do not want to convert to 'mixed' ownership. In Venezuela public credits and financing play an important role, as close to 90 per cent of all new investments are supported by the government's financing (Tomlinson & Hills, 1978).

It could be argued that Decision 24 and the Venezuelan regulations were necessary as a pre-condition for synchronized growth since the foreign capital had failed to promote regional development and had not adequately represented regional interests. Some government intervention was therefore necessary. However the proposed regional growth strategy requires increased cooperation and harmonization of interests between all partners in regional development, the important conditions which has not been met by Venezuela.

The continuation of present policies which exclude foreign investment from synchronization processes may have serious adverse effects upon development. They may discourage active foreign participation and proliferate regional problems by reducing supply of scarce factors such as highly skilled labor and know-how. They also tend to increase significantly bureaucratic procedure which further delays investment projects.

Once again economic reality seems to have prevailed over political aspirations as all the legislation has brought in little change in the pattern of foreign investments while instead it has reduced the inflow of foreign capital (Tables 30 & 31). At the same time U.S. investments have increased in other Latin American countries, mainly Brazil and Mexico.

The interests of regional development have already forced the Venezuelan government to soften 'hard regulations'. Several attempts have been made through the country's legislation to allow higher levels of profit remittance and to increase reinvestment levels, as well as to prolong regulation regarding technology contracts. All these changes are aimed to attract rather than discourage foreign investments (see also Harf, 1974; Lara Pena, 1972 & Seguias Ruiz, 1975).

Imports of Technology

Venezuela and other Andean countries seem to recognize the importance of technology transfer for regional development. In 1970, through Decision 24 the member-countries of the Andean Pact agreed on the control of all imports of technology to the region. Article 18 states :

Any contract regarding importation of technology or regarding use of patents and trademarks shall be reviewed and submitted to the approval of the pertinent agency of the respective member country which shall evaluate the effective contribution of the imported technology by means of an appraisal of its possible profits, the price of the goods embodying technology or other specific means of measuring the effect of the imported technology (IDRC, 1976, p. 37).

Vaitsos, supporting the new legislation, claims that

technology importation has structural properties that make the market-price mechanism totally inadequate in the process of defending the interests of the receiving countries (Vaitsos, 1970, p.23).

Decision 84 adopted by the Andean Pact in 1974 suggests further

CHANGES IN THE U.S. DIRECT INVESTMENT POSITION IN
LÁTIN AMÉRICA, IN MANUFACTURING (in Millions of Current U.S. Dollars)

Country	1968-70	1971-73	Percent Change
Colombia	50	76	0.52
Chile	1	-10	-11.0
Peru	16	5	- 6.94
Venezuela	128	101	- 0.211
Argentina	133	99	- 0.225
Brazil	448	971	1.167
Mexico	364	420	0.154
Panama	24	25	0.042

* change in direct investment position (D.I.P.) is measured as (DIP 1970-DIP 1968 and DIP 1973-DIP 1971), using data for U.S. manufacturing investment from the Survey of Current Business. The direct investment position includes new investment, reinvestment and retained earnings, but not loans.

Mann Whitney U = 0.1714, for comparing the changes in the ANCOM countries to the changes in other Latin America. A hypothesis that the rate of investment has been equal in the two sets of countries is rejected with greater than 80% confidence. Rerunning the test without Argentina and Chile, where severe political problems contributed to the decline in investment, yields U = 0.20, and 80% confidence level.

Source: Grosse, 1980, p. 86.

NUMBER OF SUBSIDIARIES ESTABLISHED BY U.S. MNE'S,
BEFORE AND DURING THE ANDEAN CODE

Country	1966 - 70	1971 - 75
Bolivia	5	3
Chile	28	8
Colombia	31	27
Ecuador	18	12
Peru	32	9
Venezuela	81	63
ANCOM	195	122
Argentina	82	17
Brazil	120	145
Costa Rica	23	14
Guatemala	21	20
Mexico	179	149
Nicaragua	9	9
Panama	39	35
Uruguay	9	4
Non-ANCOM Latin America	482	391

$X^2 = 9.95$	ANCOM	195	122
	Other Latin America	482	391

$$X^2_{\text{critical}} = X^2_{1, .05} = 3.84$$

Eliminating Argentina and Chile

$$X^2 = 4.982$$

$$X^2_{\text{critical}} = X^2_{1, .05} = 3.84$$

* the X^2 tests compare the total investment in ANCOM, pre-1971 and post-1970, with the total investment in other Latin American countries in each time period. A test value greater than the critical value calls for rejecting a hypothesis that the two groups of countries had equal changes in investment between time periods (at the 95% confidence level).

Source: Grosse, 1980, p. 87

that technologies imported from other countries have not been suited to the conditions prevailing in the member countries and they have misused the natural and human resources in the region. Decision 84 calls for the use of labor-intensive rather than capital-intensive production techniques which should reduce high levels of unemployment in the Andean countries. It also insists on the necessity to create local R & D capabilities in order to be able to generate 'appropriate' technologies in the future. The influence of the development theory is evident again (see Chapter II).

The Andean countries seem to agree that only the opening of technology packages and assimilation of imported knowledge can create a basis for future development of local S & T capacities. Assimilation of technology is defined as

The process of attaining a complete understanding of a technology, permitting not only its use in productive operations but also such action as - (a) its reproduction, adaptation and improvement; (b) the extension of its application to new areas or problems; (c) its full explanation and transmission to third persons; (d) the realization of further development stemming from the capacity thus acquired (IDRC, 1976, p. 46).

The new regulations define specific conditions for transfer of technology. They make the national governments' agencies responsible for new imports of foreign knowledge. In the case of Venezuela it is SIEEX who is charged with the evaluation of imported technology. Such an evaluation should include:

- (a) its effect on such aspects of technological development as the creation of demand for subregional scientific and technological activities, the use of local engineering and advisory services, and the possible effects of the technology incorporated in the project;

- (b) its effects on employment;
- (c) its contribution to specific development plans of value to the country or the Subregion;
- (d) its effects on the balance of payments and national income;
- (e) its effects on the environment (IDRC, 1976, p. 47).

Though the new technology policies as advocated by the Andean Pact are very ambitious and well defined, they also seem to be overoptimistic. It is doubtful that they will radically change the present pattern of technology transfer from advanced countries, as there are too many factors which support the existing system (see Chapter II). Venezuela and other Andean countries do not even have 'human resources' to implement strict control of technology imports, as they all lack highly skilled labor, capable of doing required assessments and evaluations.

Vaitsos has questioned the competence of government officials who are involved in negotiation of the importation of technology and he has argued that foreign companies maintain their monopolistic position as suppliers of technology. Vaitsos further claims that the Andean countries do not use their bargaining power in negotiating technology contracts, while the benefit-cost analysis is often improperly used.

On the basis of such analysis, if the net benefits for the host country exceed some minimum warranted returns, the conclusion is often reached (or implied) that foreign direct investment should be accepted rather than it should be acceptable. The former implies that the 'alternative situation' is the absence of foreign direct investment, disregarding a multiplicity of negotiable situations where foreign direct investment could still be present (Vaitsos, 1974, p.120).

Nevertheless some progress has already been made and Vaitsos insists that the Andean countries have benefited from their new technology policies. In Colombia, he suggests

In the process of negotiations, payment of royalties were reduced by about 40 per cent or about U.S. \$ 8,000,000 for 1970 (Vaitsos, 1974, p. 129).

The exact figures do appear highly speculative and may be questioned on the grounds that they are meant to support a political cause rather than reflect the real savings for the developing country.

The lack of cooperation with MNCs which are main agents in international transfer of technologies may cause 'negative effects' by curtailing the flow of innovations to Venezuela and the other Andean countries and further postponing the 'absorption', 'assimilation' and 'adaptation' of imported knowledge.

New Approach to Regional Development : CVG

CORDIPLAN, though cognizant of regional imbalances within Venezuela, was unable to change significantly the country's spatial organization. Similarly other government agencies were busy with their own sectoral problems, paying little if any attention to the spatial aspects of their policies. However, the ambitions to develop Venezuela's South remained strong among the central government and soon it was realized that they required more direct forms of government involvement and especially the constitution of new development agents which would seek to promote the growth of peripheral regions.

Political changes in the late 1950s and particularly the overthrow of the Perez Jimenez dictatorship in 1958 brought in 'new wave' to the government institutions, favouring changes in institutional structures.

Development Agent for Periphery

In 1960 the Guayana Development Agency (Corporacion Venezolana de Guayana /CVG/) was created following Decree 430 of the Presidency of the Republic. The CVG became an autonomous institution based on the concept of a politically neutral, technocratic style of operation which was initiated by the CEEC (Comision de Estudios para la Electrificacion del Caroni) established in 1953. This concept required that all regional projects be evaluated according to economic and technical criteria rather than be left

to bureaucratic bargaining.

The CVG's objectives were defined as follows:

- a. to study the natural resources of Guayana, not only within the planning area, but also outside the predefined region, if necessary;
- b. to study, develop and plan the costs and benefits of hydroelectric development potential of the Caroni River;
- c. to program the integral development of the region in conformity with the national norms and within the limits set by the national plan;
- d. to promote industrial development of the region including both public and private sectors;
- e. to co-ordinate the actions of other institutions and organizations which affect social and economic development of the region;
- f. to contribute to planning and development of public services which are essential for the designated area initially mainly Ciudad Guayana;
- g. to exercise through the decision of the national executive any other actions which could include other areas but must be linked to the Guayana program (see CVG, Informe Anual 1965, Anexo).

The CVG's objectives suggest that the new institution should play an important role not only as a development agent but also in harmonization of interests and actions of all involved partners. Corrada has noticed that

the coordination of the activities of other public agencies in the Guayana is an explicit function granted under the CVG's charter (Corrada, 1969, p. 343).

The CVG became the only executive government agency attached directly to the President. Friedmann has claimed that the new agency was modeled after the Tennessee Valley Authority (Friedmann, 1966, p. 176).

In the planning process itself the CVG closely cooperated with the Joint Center for Urban Studies of Harvard University and MIT, but as noted by Dinkelspiel

despite the heavy influence of foreign consultants, it does not overstate the case to say that the Guayana development owes its shape fundamentally to indigenous influences (Dinkelspiel, 1970, p. 50).

Guayana Development Program

The Guayana development program differs significantly from regional planning experiences in many other countries not only because of its impressive size and objectives, but also because of the new approach adopted by the Venezuelans, which makes this program closer to our ideas of a synchronized growth strategy.

The Guayana project was placed as much within economic as strictly geographic space of the region. The initial planning area was additionally changed in 1973 by Decree 1197, adding the rest of Estado Bolivar, except the Cedeno District and the Federal Territory - Delta Amacuro, therefore giving even more flexibility to the planners who were no longer restricted to a very small planning area.

The Venezuelan government incorporated the Guayana development into its national plan. The national goals were as important if not more so

than the regional ones. The Venezuelan economy needed basic and intermediate industries, whereas most manufacturing in the 'center' was concentrated in final, consumer products, mainly final-assembly production, promoted by the import substitution policies. The country also needed more efficient industries which would be able to compete on international markets. Caracas was already overcrowded and there was a need for a new industrial center. The Guayana Region was chosen not accidentally but mainly because of the rich resource base, with huge reserves of iron ore and hydroelectric potential. The region seemed to have not only comparative but also absolute advantage over other parts of the country. Friedmann has claimed that

the genuine strength of the region derived from its considerable potential for the development of low-cost power (up to 10 million kilowatts), its very large high-grade iron ore deposits (1.3 million tons/estimated more recently at 1.8 billion tons - The Latin American Times, February 1981/), its vast petroleum (ca. 2.2 billion barrels) and natural gas reserves (ca. 300,000 million cubic meters), its extensive hardwood forests (ca. 44 million cubic meters), unlimited supplies of fresh water, and a location which, though peripheral to the country's main centers, was readily accessible by air, sea, and land (Friedmann, 1966, pp. 177-178).

The government planned a total investment of almost \$4 billion in the Guayana Region in 1965-1975, of which the public sources were to supply more than half of the above sum and the rest was to be provided by private sector and foreign capital (Rodwin, 1969). The Guayana project would account for over 10 per cent of the total public investment (Table 32) with major investments in hydro-electricity and the manufacturing sector. A high priority was given to a few selected industries including the basic metals industry, heavy machinery and equipment, pulp and paper industry,

TABLE 32

VENEZUELA: PLAN DE LA NACION, INVESTMENT
TARGETS AND THE ROLE OF THE GUAYANA PROGRAM
1963 - 1966

	Investment Percentage Composition (Bs Millions at 1960 Prices)				Guayana as per cent of Venezuela
	Venezuela	Guayana	Venezuela	Guayana	Total
Agriculture	2,681	40	10.2%	1.5%	1.5
Petroleum and Mining	3,000	411	11.4%	15.2%	13.7
Manufacturing	5,134	1,061	19.5%	39.2%	20.7
Electricity, Gas and Water	1,373	472	5.2%	17.4%	34.4
Transport and Communication	2,802	313	10.6%	11.5%	11.2
Commerce	2,187	22	8.3%	0.8%	1.0
Housing and Urban Development	5,414	273	20.6%	10.1%	5.0
Government and Other Services	3,757	117	14.2%	4.3%	3.1
Total	26,348	2,709	100.0%	100.0%	10.3

Source: 1. Oficina Central de Coordinación y Planificación, Plan de la Nación
1963 - 1966, Caracas, 1963, Tables III.2 and XIV.3

2. Alamo Blanco & Ganz, 1969, p. 65

chemical products and construction materials (Table 33). All main industrial projects were 'unique' and they were additionally motivated by the country's 'ideology' and ambitions. The Guri Dam was to become one of the largest hydroelectric projects in the world. Alamo Blanco & Ganz have noticed that

designed for 1,750,000 kilowatts of electric power capacity on the completion of the first stage, with ten generating units, it is presently exceeded in capacity size by only two dams in the Western world, the Grand Coulee Dam on the Columbia River and the Robert Moses Dam at Niagara Falls (Alamo Blanco & Ganz, 1969, p. 167).

The iron and steel industry as well as the aluminum industry located in Guayana were to place Venezuela among the top producers at least in Latin America. The Latin American Times has reported recently that

local economists are certain that with the expected achievement of these goals (i.e. 10 million tons of steel in 1985 and 15 million in 1990) the country will rank, behind Brazil and Mexico, as the third largest steel producer in the region (The Latin American Times, 1981, p. 23).

The Guayana program was based on most modern technology which had to be imported from advanced countries. The 'appropriateness' of Western technologies was not questioned while again it had a popular support of the country's politicians and planners.

The selection of concrete projects for Guayana was made after studies of relations within mostly economic spaces had been completed. Emphasis was placed upon

- 1) modern technology that was related to the Guayana's unique resources;

TABLE 33

PRELIMINARY PRODUCTION GOALS FOR GUAYANA, 1964 and 1970

Millions of Bolivars at 1962-1963 prices

	1964	1970
Resource Development	493	887
a. Hydroelectric Energy	19	71
b. Gas	-	20
c. Minerals	470	788
d. Agriculture	4	8
Industrial Development	563	4,398
a. Heavy Industry	419	3,897
1. Metals	405	3,051
2. Chemical Products	-	76
3. Heavy Machinery and Equipment	-	637
4. Construction Materials	14	31
5. Pulp and Paper	-	102
b. Light Industry	30	239
c. Construction Industry (Value Added)	114	262

* the conversion rate of Bs to \$ was approximately 3.2 to 1

(in 1980 \$ 1 = ± Bs 04.17)

Source: Friedmann, 1966, p. 183

2) domestic and export demand; 3) economic scale to achieve competitive output and pricing; 4) integration and complementarity with the Venezuelan economy as a whole, and 5) linkages, external economies, and transportation factors (Alamo Blanco & Ganz, 1969, p. 66).

The Guayana's industries were expected to develop forward and backward linkages with other national industries and therefore contribute to the integration of the country's economy. It was hoped that the heavy industries would create external economies and gradually attract industries producing consumers' goods.

The Guayana's manufacturing sector was to account for over 20 per cent of the gross production value of the Venezuelan industries in 1980s. The region's employment was to increase its national share to 2.3 per cent in 1980 (Table 34). It was also expected that the accelerated growth of Guayana's manufacturing would change the country's exportation structure, as exports from newly created industries would constitute 23.5 per cent of the total Venezuelan exports in 1980.

Despite the enormous investment effort, the region's industries contributed only 3.14 per cent to the gross production value of the country's manufacturing in 1971 (Table 35) and 3.43 per cent in 1976 (VI Encuesta Industrial, 1980), which was far behind the projected 9.0 per cent for 1970 and 15.3 per cent for 1975. It seems obvious that the 1980's levels will also not be reached.

Within the manufacturing sector only the basic metals industries are of national importance. In 1971 more than 90 per cent of the Venezuelan fixed capital in the basic metals industries was concentrated in Guayana

TABLE 34

GUAYANA REGION: GROWTH AND DEVELOPMENT TARGETS
1961-1980, AS PER CENT OF VENEZUELAN TOTAL

	Guayana as Per Cent of Venezuela				
	Actual		Potential		
	1961	1965	1970	1975	1980
Population	0.6	0.8	1.4	1.9	2.3
Employment	0.5	0.9	1.4	1.9	2.3
Gross Product, Total	1.0	2.8	4.0	5.0	7.6
Gross Product, Manufacturing	0.4	7.5	9.0	15.3	21.0
Exports	6.4	5.8	6.6	15.8	23.5

- Source: 1. CVG, The Guayana Program, Key to the Development of Venezuela, Caracas, 1966
2. Alamo Blanco & Ganz, 1969, p. 64
3. Izaquirre, 1977, p. 83

TABLE 35

GROSS PRODUCTION VALUE BY SECTORS AND REGIONS (percentages of total national)

SECTORS	Capital Region	Central Region	Centro-Occ. Region	Zulia Region	Los Andes Region	Sur Region	Nor-Orient. Region	Guayana Region	Venezuela total
Traditional Ind.	42.56	28.16	9.07	11.14	3.50	0.05	4.94	0.57	100
Food	30.26	28.67	14.02	16.57	4.69	0.09	5.37	0.33	100
Beverages	44.67	12.14	8.72	16.07	3.81	-	13.03	1.50	100
Tobacco	70.04	70.04	0.77	-	0.33	-	1.88	-	100
Textiles	40.84	53.85	1.89	0.25	1.40	-	1.76	-	100
Clothing	96.32	0.45	1.16	1.69	0.28	-	-	-	100
Leather & Prod.	24.25	52.08	-	4.74	-	-	0.67	-	100
Footwear	82.31	11.65	2.41	1.37	1.32	-	-	-	100
Wood Products	36.85	19.83	16.26	8.14	9.87	-	4.69	4.32	100
Furniture	70.78	11.77	3.19	6.70	2.53	-	3.77	1.25	100
Intermediate Ind.	23.81	23.45	34.99	5.54	0.57	0.01	4.64	6.99	100
Pulp & Paper	39.16	55.16	-	0.79	-	-	-	-	100
Chemicals	63.26	33.55	0.48	2.05	0.14	-	0.52	-	100
Petrol. & Coal Pr.	0.26	9.40	-	7.78	-	-	8.03	-	100
Rubber & Prod.	42.04	51.46	2.16	1.16	1.26	-	1.80	-	100
Plastic Prod.	71.06	26.63	-	-	-	-	-	-	100
Non-Met. Minerals	27.32	40.93	7.82	12.00	2.40	0.06	7.61	1.87	100
Basic Metals	25.32	11.99	1.91	2.34	0.23	-	0.25	57.95	100
Iron & Steel	-	-	-	-	-	-	-	58.48	100
Non-Ferr. Met. (AL)	-	-	-	-	-	-	-	54.66	100
Mechanical Ind.	37.59	55.17	1.17	3.56	0.65	-	1.48	0.36	100
Metal Products	42.66	45.36	1.85	5.55	2.20	-	1.32	1.00	100
Machinery (ex. Elec.)	74.88	10.95	5.04	6.14	0.29	-	2.09	0.62	100
Machin. & Electr. Eq.	45.91	46.12	-	7.67	-	-	-	-	100
Motor Vehicle & Tr.	27.35	69.15	0.77	0.57	0.07	-	2.01	0.08	100
Residual Group	75.73	13.05	2.77	5.18	1.58	-	1.23	0.45	100
Graphic Arts	72.28	15.20	2.57	6.21	1.76	-	1.39	0.55	100
Others	83.69	8.07	3.22	2.78	1.18	-	0.85	-	100
Total	35.14	29.96	18.21	7.53	1.82	0.03	4.18	3.14	100

Source: calculations based on statistical information from III Encuesta Industrial 1971, Resultados Regionales, CORDIPLAN, 1973

(Table 36). The gross production values and the value added show a disproportionate development of the Guayana's heavy industry in relation to other sectors (Table 35 & 37). Both the traditional industries and the mechanical industries have been neglected. As a result of such a strategy most consumers' products and food have to be imported from other regions.

The Guayana industries were more fortunate in terms of job creation, as the planned figures have been surpassed. In 1971 the region's manufacturing provided jobs for 8,825 people. This constituted 3.64 per cent of the country's manufacturing employment (Tables 38 & 39). In 1976 the Guayana's share increased to 4.54 per cent and the region's industries employed 17,828 people (VI Encuesta Industrial, 1980). Within the manufacturing sector the basic metals industries are the major regional employer. In 1971 they accounted for 77.76 per cent of the Guayana's manufacturing employment.

The higher than planned employment levels and the dominating position of the basic metals industries in job creating though regarded as generally positive development, may reflect lower productivity levels of the regional industries than initially assumed by the Venezuelan planners.

The export situation of the Guayana's manufacturing is the most disappointing as some of the major exporters have decreased rather than increased their total sales in foreign markets, particularly the iron and steel industry which will be discussed later in the study.

TABLE 36
FIXED CAPITAL BY SECTORS AND REGIONS (percentages of total national)

SECTORS	Capital Region	Central Region	Centro Occ. Region	Zulia Region	Los Andes Region	Sur Region	Nor-Orient. Region	Guayana Region	Venezuela Total
Traditional Ind.	32.13	31.70	13.86	7.57	5.60	0.29	8.13	0.72	100
Food	23.90	24.13	21.95	9.80	8.18	0.52	11.13	0.38	100
Beverages	37.28	10.99	11.46	17.08	5.62	-	15.32	2.08	100
Tobacco			0.53	-	1.08	-	0.62	-	100
Textiles	27.65	66.45	3.17	0.05	1.05	-	1.61	0.01	100
Clothing	94.87	0.92	2.12	1.30	0.50	-	-	-	100
Leather & Leather Pr.	13.01	78.16	-	-	3.77	-	0.89	-	100
Footwear	76.32	15.62	2.59	2.29	2.66	-	3.68	5.62	100
Wood Products	34.07	26.42	15.03	6.33	8.68	-	6.35	1.98	100
Furniture	52.64	21.90	4.94	6.70	5.44	-	-	-	100
Intermediate Ind.	11.92	23.30	28.31	3.46	0.95	0.01	2.79	29.27	100
Pulp & Paper	21.67	76.46	-	0.16	-	-	-	-	100
Chemicals & Chem. Pr.	36.17	61.04	0.57	1.84	-	-	0.27	-	100
Petroleum & Coal Pr.	0.20	10.53	-	5.73	0.29	-	4.05	-	100
Rubber & Rubber Pr.	32.72	56.56	4.45	2.29	3.11	-	0.85	-	100
Plastic Products	65.49	31.02	-	-	-	-	-	-	100
Non-Metallic Minerals	24.98	40.19	7.41	7.35	5.51	0.05	10.62	3.88	100
Basic Metals	3.15	2.78	0.28	0.78	0.07	-	0.06	92.88	100
Iron & Steel									100
Non-Ferr. Met. (Al)									100
Mechanical Industr.	32.24	55.04	1.64	5.79	1.03	-	2.96	1.27	100
Metal Products	33.51	54.91	1.70	5.39	1.99	-	1.03	1.41	100
Machinery (ex.Elec.)	69.17	14.40	3.74	8.82	0.32	-	1.59	1.96	100
Machin. & Electric Eq.	31.28	58.18	-	7.90	-	-	-	-	100
Motor Vehicle & Transp.	21.91	62.84	2.04	4.16	0.41	-	8.40	0.23	100
Residual Group	68.49	18.14	2.72	4.36	2.63	-	3.12	0.51	100
Graphic Arts	66.28	20.13	1.92	6.84	2.67	-	3.59	0.54	100
Others	78.67	9.02	6.37	2.15	2.45	-	0.98	-	100
Total	20.87	28.37	21.20	4.88	2.36	0.09	4.37	17.86	100

Source: Calculations based on statistical information from III Encuesta Regional 1971, Resultados Regionales, CORDIPLAN, 1973.

TABLE 37
 VALUE ADDED BY SECTORS AND REGIONS (percentages of total national)

SECTORS	Capital Region	Central Region	Centro Occ. Region	Zulia Region	Los Andes Region	Sur Region	Nor-Orient. Region	Guayana Region	Venezuela total
Traditional Ind.	46.68	26.46	7.84	9.57	2.87	0.07	5.84	0.67	100
Food	33.80	29.07	13.14	13.30	3.66	0.13	6.50	0.40	100
Beverages	48.20	9.22	7.78	16.60	3.48	-	13.37	1.27	100
Tobacco	35.99	58.63	1.02	-	0.45	-	3.91	-	100
Textiles	36.68	58.50	2.42	0.22	1.44	-	0.74	-	100
Clothing	96.91	0.47	0.52	1.70	0.28	-	-	-	100
Leather & Pr.	28.84	48.61	-	-	2.82	-	0.50	-	100
Footwear	83.43	11.00	1.61	1.64	1.33	-	-	-	100
Wood Products	33.77	21.65	17.16	7.49	9.12	-	5.74	4.99	100
Furniture	70.09	11.60	2.73	7.26	2.79	-	3.89	1.63	100
Intermediate Ind.	33.85	31.80	11.58	7.68	0.88	0.01	4.56	10.03	100
Pulp & Paper	35.25	60.56	-	0.91	0.06	-	-	0.09	100
Chemicals	67.98	1.79	0.37	0.08	0.06	-	0.54	-	100
Petr. & Coal Pr.	0.64	16.57	-	22.65	1.56	-	15.57	-	100
Rubber & Prod.	39.12	55.91	1.52	1.38	0.96	-	0.93	-	100
Plastic Prod.	70.86	27.54	-	-	0.20	-	-	-	100
Non-Metallic Min.	24.47	44.86	8.83	11.93	2.47	0.05	6.11	1.27	100
Basic Metals	19.84	12.46	1.75	1.32	0.25	-	0.20	64.24	100
Iron & Steel	-	-	-	-	-	-	-	59.15	100
Non-Ferr. Met (Al)	-	-	-	-	-	-	-	0.50	100
Mechanical Industries	37.84	54.06	1.34	3.88	0.65	-	1.71	0.50	100
Metal Products	43.72	44.05	1.78	5.88	1.91	-	1.41	1.21	100
Machinery (exc. Elec.)	73.62	71.46	4.35	6.52	0.15	-	3.08	0.82	100
Machinery & Elec. Eq.	47.18	46.60	-	5.86	-	-	-	-	100
Motor-Vehicle & Tran.	23.00	72.22	1.13	0.94	0.10	-	2.50	0.11	100
Residual Group	74.47	11.94	3.03	6.74	1.69	-	1.57	0.53	100
Graphic Arts	71.68	13.09	2.89	7.82	2.03	-	1.80	0.66	100
Others	81.12	9.20	3.36	4.18	0.87	-	1.02	-	100
Total	41.60	32.37	7.82	7.84	1.73	0.04	4.53	4.07	100

Source: calculations based upon information from III Encuesta Industrial 1971, CORDIPLAN, Caracas, 1973.

TABLE 3
EMPLOYMENT BY REGIONS AND SECTORS

	Capital Region	Central Region	Centro-Occ. Region	Zulia Region	Andes Region	Sur Region	Nor-Orient. Region	Guayana Region	Venezuela Region
Trad. Industries	57,081	51.68	29,375	41.84	9,927	59.51	9,456	60.87	6,043
Food	15,092	13.66	11,120	15.84	5,788	37.40	5,824	37.49	3,219
Beverages	3,085	2.79	1,482	2.11	887	5.32	1,415	9.11	593
Tobacco	1,053	0.95	1,094	1.56	142	0.85	-	-	134
Textiles	7,296	6.61	11,501	16.38	729	4.37	59	0.38	533
Clothing	15,202	13.76	161	0.23	333	2.00	368	2.37	98
Leather & Products	912	0.83	726	1.03	44	0.26	326	2.10	169
Footwear	6,987	6.33	896	1.28	173	1.04	134	0.86	273
Wood Products	2,133	1.93	1,251	1.78	1,400	8.39	536	3.45	540
Furniture	5,321	4.82	1,144	1.63	431	2.58	794	5.11	484
Intermed. Industries	27,721	25.10	21,702	30.91	5,042	30.23	3,213	20.68	1,151
Pulp & Paper	3,593	3.25	3,914	5.58	363	2.18	63	0.41	27
Chemicals	11,079	10.03	5,857	8.34	189	1.13	481	3.10	73
Petroleum & Coal Prod.	145	0.13	665	0.95	2,938	17.61	473	3.04	8
Rubber & Products	3,039	2.75	1,828	2.60	181	1.09	127	0.82	110
Plastic Products	3,466	3.14	1,161	1.65	15	0.09	46	0.30	35
Non-Metallic M.	4,570	4.14	6,596	9.40	1,190	7.13	1,756	11.30	773
Basic Metals	1,829	1.66	1,681	2.39	166	1.00	267	1.72	125
Mechanical Industries	16,858	15.26	17,622	25.10	1,099	6.59	2,174	13.99	733
Machin. (ex. Elec.)	2,309	2.09	683	0.97	255	1.53	222	1.43	23
Mach. & Elec. Equipment	3,850	3.49	3,173	4.52	43	0.26	573	3.69	-
Motor Veh. & Tr.	3,928	3.56	7,660	10.91	248	1.49	318	2.05	30
Metal Products	6,771	6.13	6,106	8.70	553	3.32	1,061	6.83	680
Residual Group	8,799	7.97	1,503	2.14	613	3.67	692	4.45	509
Graphic Arts	5,705	5.16	1,106	1.58	434	2.60	546	3.51	397
Others	3,094	2.80	397	0.57	179	1.07	146	0.94	112
Total	110,459	100	70,202	100	16,681	100	15,535	100	8,436

Source: Based on information from III Encuesta Industrial 1971, CONDIPLAN, 1973.

TABLE 39
EMPLOYMENT BY REGIONS AND SECTORS (PERCENTAGES OF TOTAL NATIONAL)

SECTORS	Capital Region	Central Region	Centro-Occ. Region	Zuliana Region	Andes Region	Sur Region	Nor-Orient. Region	Guayana Region	Venezuela
Traditional Industries	47.05	24.21	8.18	7.79	4.98	0.19	6.67	0.92	100
Food	33.20	23.73	12.35	12.43	6.87	0.42	11.09	0.92	100
Beverages	33.82	16.24	9.72	15.51	6.50	0.22	15.84	2.15	100
Tobacco	38.94	40.46	5.25	-	4.96	-	10.39	-	100
Textiles	35.75	56.36	3.57	0.29	2.61	-	1.39	0.02	100
Clothing	93.81	0.99	2.05	2.27	0.60	-	0.18	0.09	100
Leather & Products	40.84	32.51	1.97	14.60	7.57	-	1.30	1.21	100
Footwear	82.07	10.53	2.03	1.57	3.21	-	0.14	0.45	100
Wood Products	32.96	19.33	21.63	8.28	8.34	0.11	5.28	4.06	100
Furniture	60.47	13.00	4.90	9.02	5.50	0.06	5.41	1.64	100
Intermediate Industries	40.48	31.69	7.36	4.69	1.68	0.05	3.60	10.44	100
Pulp and Paper	44.95	48.96	4.54	0.79	0.34	-	0.28	0.15	100
Chemicals	62.05	32.80	1.06	2.69	0.41	-	0.98	-	100
Petroleum & Coal Products	2.85	13.08	57.80	9.31	0.16	-	16.60	0.20	100
Rubber & Products	56.59	34.04	3.37	2.36	2.05	-	1.36	0.22	100
Plastic Products	73.39	24.58	0.32	0.97	0.74	-	-	-	100
Non-Metallic Minerals	27.77	40.08	7.23	10.67	4.70	0.19	7.83	1.53	100
Basic Metals	16.64	15.29	1.51	2.43	1.14	-	0.57	64.42	100
Iron & Steel	-	-	-	-	-	-	-	66.71	100
Non-Ferrous M. (Al)	-	-	-	-	-	-	-	36.14	100
Mechanical Industries	42.17	44.08	2.75	5.44	1.83	0.06	2.57	1.10	100
Metal Products	42.75	38.55	3.49	6.70	4.29	0.14	2.12	1.96	100
Machinery (ex. Electr.)	64.71	19.14	7.15	6.22	0.64	-	1.23	0.90	100
Machinery & Elec. Equipment	49.88	41.11	0.56	7.42	-	-	0.40	0.63	100
Motor Vehicle & Transport	30.57	59.62	1.93	2.47	0.23	-	4.79	0.38	100
Residual Group	69.68	11.90	4.85	5.48	4.03	0.07	3.02	0.96	100
Graphic Arts	66.06	12.81	5.03	6.32	4.60	0.10	3.91	1.17	100
Others	77.52	9.95	4.49	3.66	2.81	-	1.08	0.50	100
Total (all industries)	45.57	28.96	6.88	6.41	3.48	0.12	4.84	3.64	100

Source: Calculations based on data from Table 38.

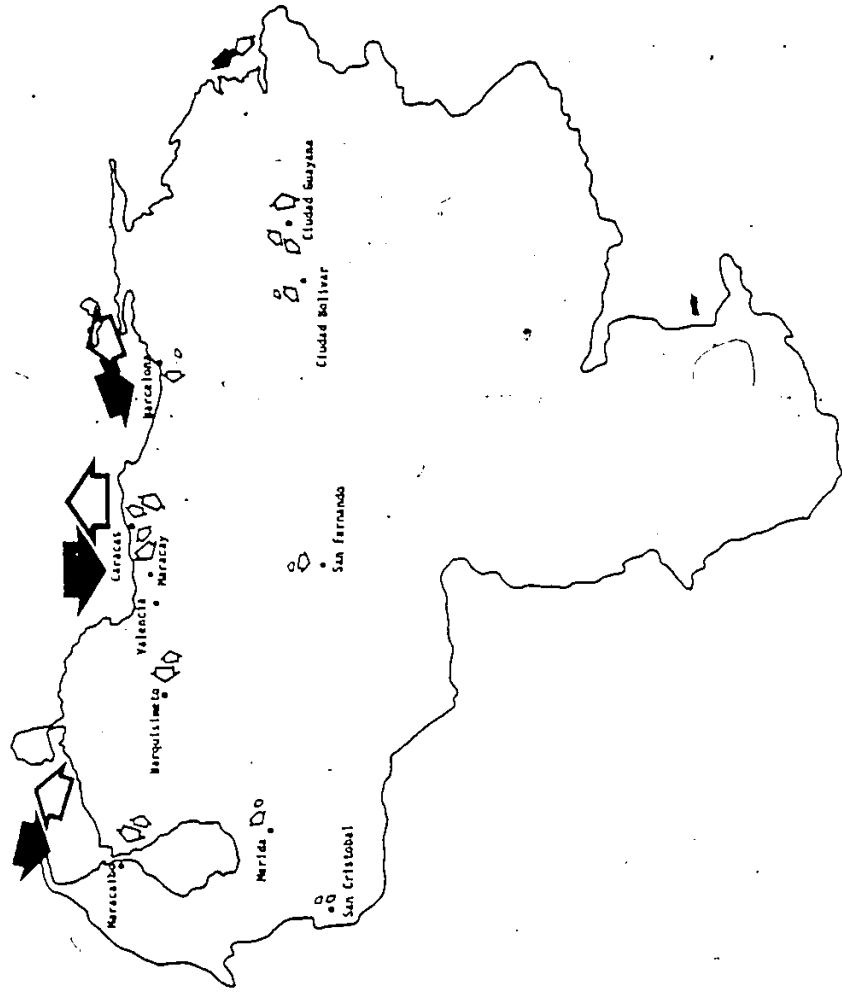
Spatial Aspects of the Program

In a simplified form, the CVG's main role was to create a new growth center which would have 'trickling down' effects over the regional and national economies and which would contribute to the change of the existing 'center-periphery' structure. The relative importance of Caracas was to diminish while second order centers including Maracaibo and Barcelona - Puerto la Cruz would gain in importance. Ciudad Guayana was meant to join the main national growth centers (see Map 4 and also Friedmann, 1966 & Travieso, 1972).

Within the Guayana Region itself the following spatial organization was promoted:

- (i) an urban-regional system with four nuclei and a specific hierarchy where
 - a. Ciudad Guayana becomes a main industrial center and Ciudad Bolivar remains a political and cultural center;
 - b. Upata and Tucupita serve as agronomic centers, and Tucupita plays also the role of administrative and political center for the territory of Delta Amacuro which was added to the Guayana Region;
 - c. Guri, Ciudad Piar and El Pao become service centers;
 - d. rural communities and mineral camps have the lowest-order functions;
- (ii) a division into five subregions, according to their physical characteristics, economic relations, mainly flows of goods and services and urban functions; the following subregions were distinguished - Bajo Caroni,

Map 4 : Venezuela : Major Growth Centers, Flow of Goods and Services

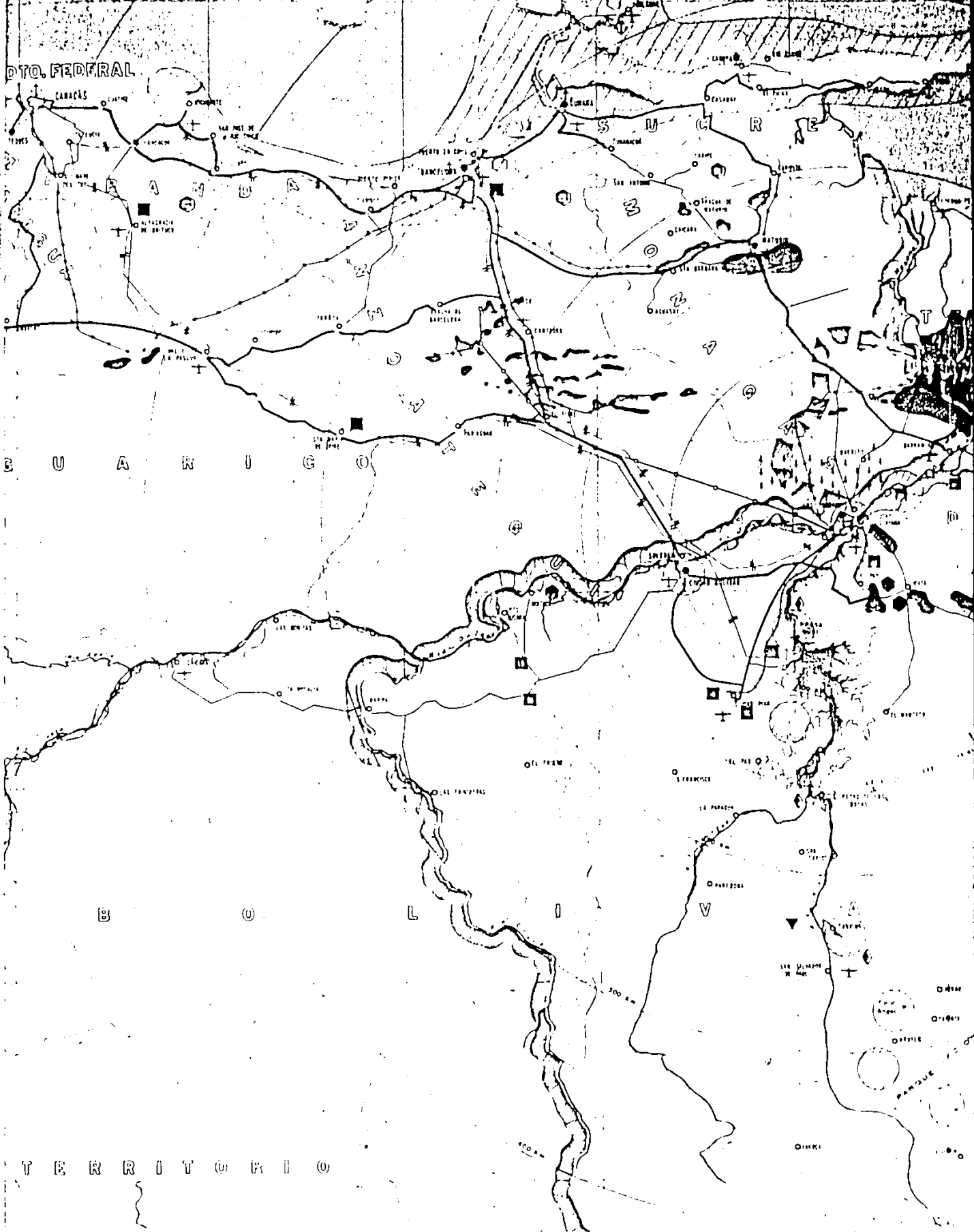


Cuyum, Occidental, Deltaica and Alto Caroni. Each of the sub-regions was to specialize in different forms of economic activities which were expected to have comparative advantage and be complementary (Izaguirre, 1977, p. 18, see also Map 5).

The major industrial projects were located in Ciudad Guayana. The new job opportunities attracted migrants from other regions. The population of Ciudad Guayana increased rapidly from approximately 4,000 in 1950 to 37,000 in 1961 and 220,000 in 1975. It was close to 300,000 at the beginning of 1980 (Rodwin, 1969; Izaguirre, 1977 & Informes Anuales, CVG). Though the actual numbers are close to demographic projections, the population distribution in the two sectors of the new city does not at all follow the planned growth. Indeed, it is opposite to the urban plans and it reveals the dramatic increase of the unplanned growth of San Felix - the eastern sector of Ciudad Guayana (Figure 3). Such population growth has put enormous pressure on the CVG to devote more attention to all kinds of social needs of Ciudad Guayana. First of all there is a serious deficit of housing, estimated at 46.1 per cent in the new city, compared to 20.2 per cent deficit in Caracas and 17.1 per cent in Valencia (MERCAVI-70, 1971).

The CVG was unable to control the housing situation and it had to depend on cooperation with both public and private institutions. Synchronization processes in development of the city were more important and in that field the CVG's initiative has proven to be less effective. Nevertheless the CVG has succeeded in initiating cooperation with public agencies, such as Banco Obrero which plays an important role in low-income housing, as well as

Map 51: Guayana Region; Natural Resources, Land Use and Main Urban Centers

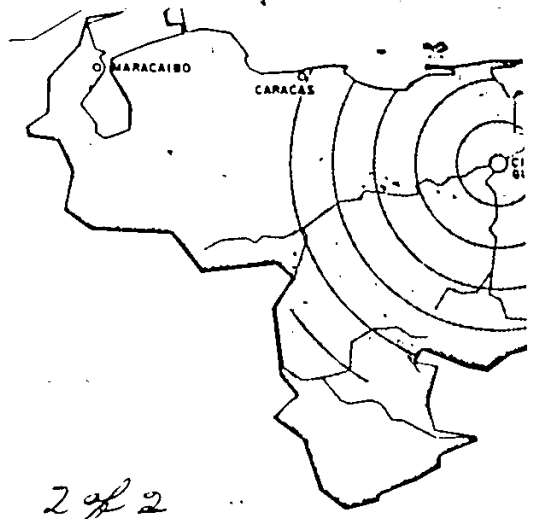
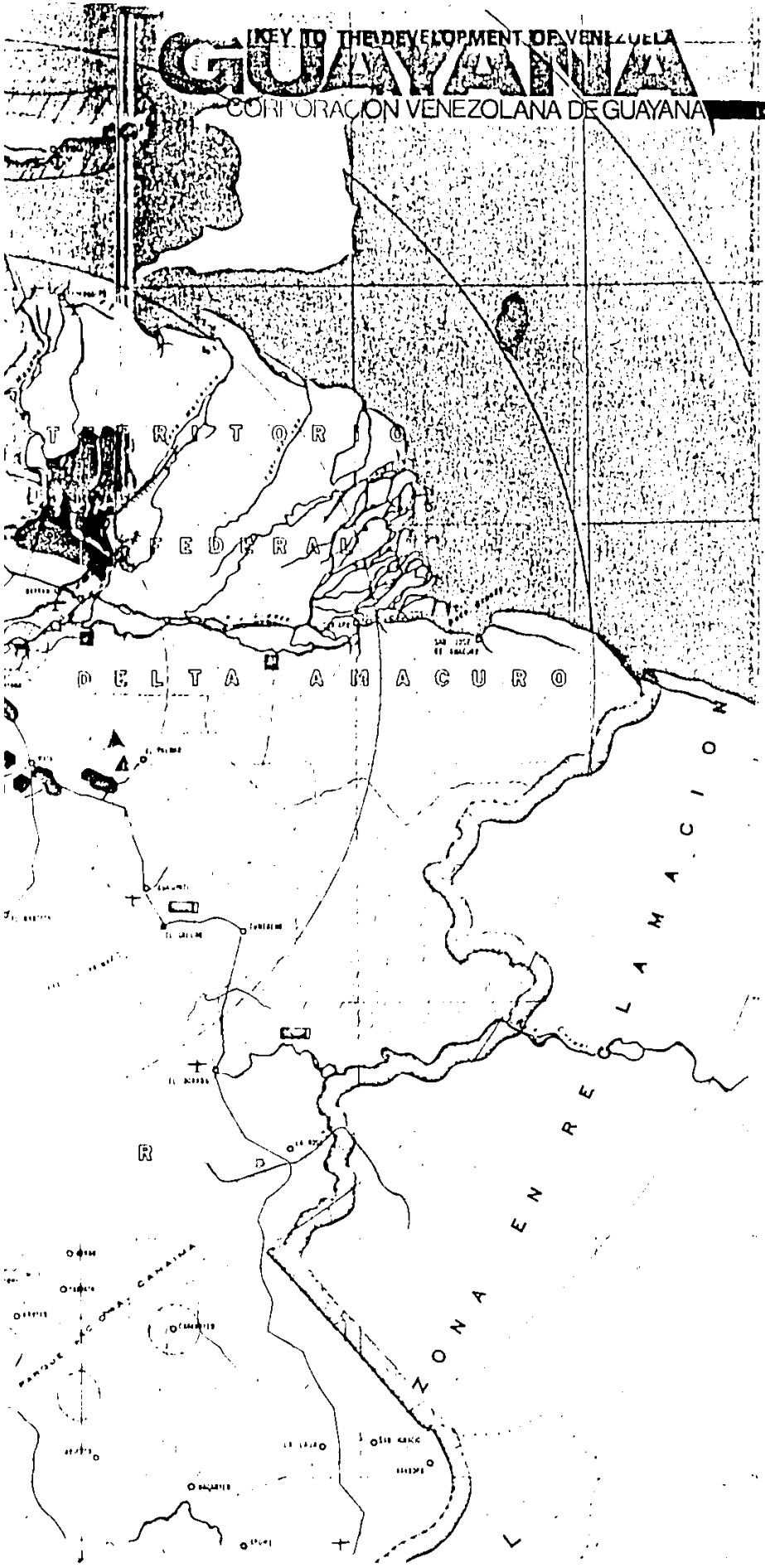


1 of 1

KEY TO THE DEVELOPMENT OF VENEZUELA

GUAYANIA

CORPORACION VENEZOLANA DE GUAYANA



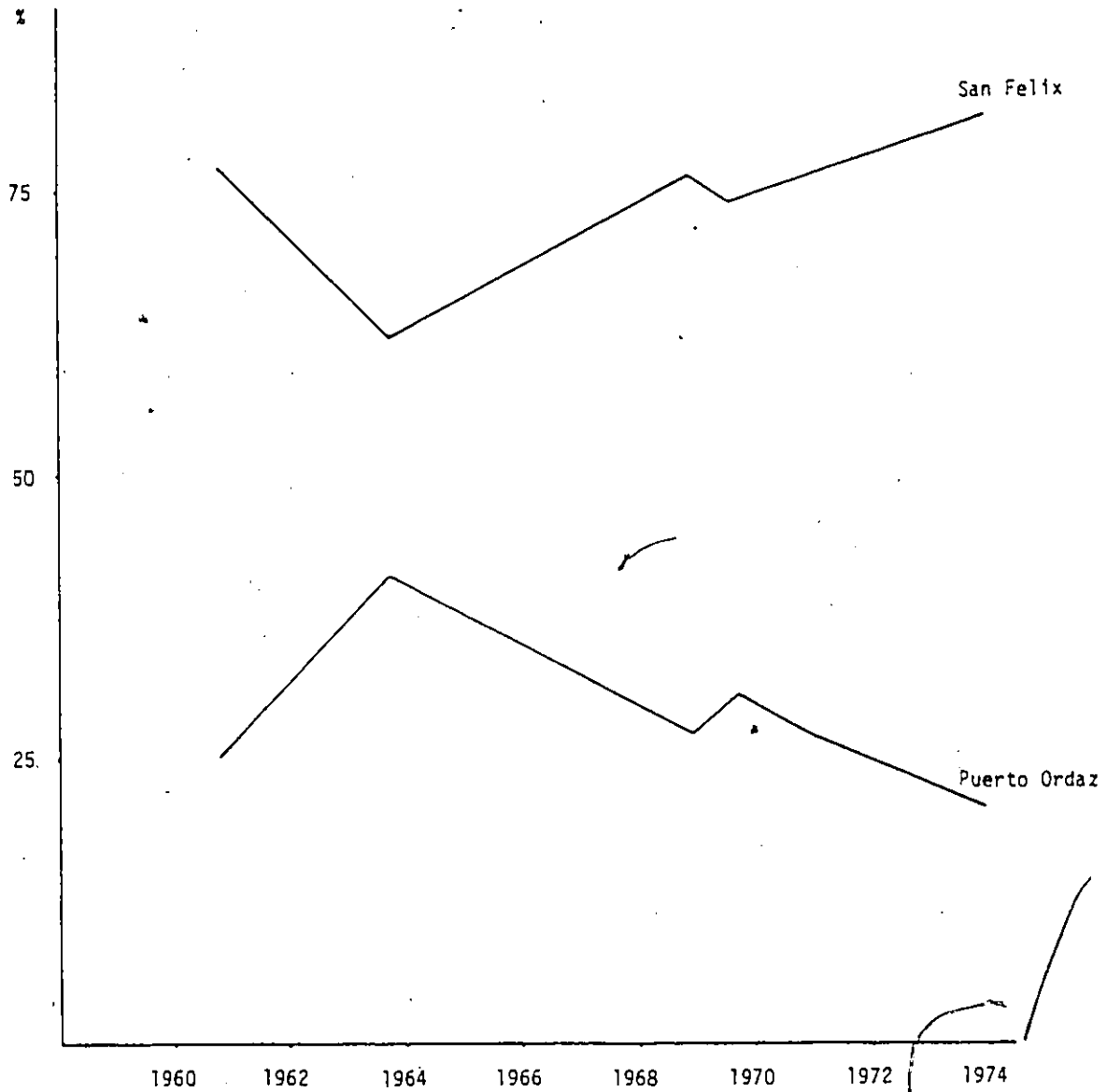
2 of 2

LEGENDS

- | | |
|--------------------|------------|
| REGIONAL LIMITS | LIVESTOCK |
| STATE CAPITALS | FOREST R |
| DISTRICT CAPITALS | CARIBE |
| STATE LIMITS | OIL EXPLC |
| HIGHWAYS | OIL BEARIN |
| ROADS | IRON ORE |
| DIKE ROAD | DIAMONDS |
| RAILROAD | GOLD |
| DIKE | COAL |
| NAVIGATION CHANNEL | SALT |
| OIL PIPELINE | MANGANESE |
| GAC PIPELINE | MAGNESITE |
| 400 KW POWER LINE | DOLOMITE |
| 230 KW POWER LINE | KAOLIN |
| AIRPORT | LIME |
| PORT | GYPSUM |
| TOURIST AREAS | BAUXITE |

Source : Os. 1980 (cvc) /repr./

Figure 3 : Ciudad Guayana - Population Distribution / Puerto Ordaz and San Felix /



Source : Garcia, 1977, p. 6

private institutions, such as Foundation for Housing (Fundacion de la Vivienda Popular) to construct a limited number of housing units for middle income groups. The CVG has also established the Municipal Housing Foundation (Fundacion de la Vivienda del Caroni - Funvica) to help solve the housing deficit and the Savings and Loan Association (Asociación Guayanesa de Ahorro y Prestamo) to provide credits. It has also offered special incentives to private constructors through lower land prices and various credit arrangements. According to the study by Garcia (1977) more than 60 per cent of the population of Ciudad Guayana prefers to construct their own housing units rather than buy from the official construction agencies.

The present pattern of urban development promotes further disparities between rich and poor and these disparities are even more pronounced than in other parts of the country. Stinchcombe gives several reasons for the potential increase of social tensions in Ciudad Guayana:

First, heavy industry and mining create a working class concentrated in a few factories, without daily contact with many middle-class people. The social isolation of workers from middle-class people is increased by planner tendencies to build blocks of lower-income housing separate from middle-class housing. The planned parts of Ciudad Guayana are much more segregated by social class than the parts that have grown up spontaneously (Stinchcombe, 1969, p. 417).

Ciudad Guayana has also a serious deficit of skilled labor and the CVG will have to give more attention in the future to the educational programs. The city itself is unable to satisfy the growing demand for skilled labor (Table 40) and it continues to attract mostly unskilled migrants.

TABLE 40

SUPPLY OF EDUCATION PROJECTED FOR THE SCHOOLS OF
CIUDAD GUAYANA COMPARED WITH LABOR FORCE DEMAND

Educational Level	1975 Labor Force Demand	Education Provided in Ciudad Guayana 1966-1975	Difference Demand - Supply
Postgraduate studies	332	-	332
University level			
Architecture, engineering, sciences	1,455	-	1,455
Law, economics, humanities	1,111	-	1,111
Medicine, dentistry	254	-	254
Veterinary, agronomy	56	-	56
Instituto pedagogico	568	-	568
Instituto politecnico	755	-	755
High-school level			
Technical-artisanal	10,190	6,475	3,715
Commercial	6,036	3,280	2,756
Academic	3,120	3,218	- 98
Normal	1,220	-	1,220
Agricultural	189	-	189
Nursing	442	-	442
Primary-school graduate	17,215	17,348	- 133
4-5 years primary	10,427	12,626	-2,199
0-3 years primary	-8,384	7,834	-16,218

* negative numbers indicate that the total number of people leaving school at this level exceeds the minimal number required by the labor force

Source: Davis & McGinn, 1969, p. 274

Evaluation of the Guayana Development

Evaluation of the Guayana development program is not an easy task and the interpretation may be negative or positive depending on one's criterion. Doutriaux & Osborne have argued that

Like many other public development corporations, CVG suffers from having disparate objectives and responsibilities. On the one hand, it wants to show some operating surplus to justify the enormous investment capital it has received, and this in the hostile environment of a new plant using new technology in an area poor in services, industrial infrastructure, trained manpower and experienced middle management; on the other hand it is supposed to contribute to the industrialization goals of the country by selling its products as cheaply as possible to the local users, and to the development of the region by building its social and industrial infrastructure. Added to the political and social pressures that come with prosperity, these conflicting objectives make it difficult for the top management to take good decisions. (Doutriaux & Osborne, 1980, p. 9).

Friedmann has recently criticised the Venezuelan achievements and commented that the planners produced 'a piece of old Venezuela' (Friedmann & Weaver, 1977). Chossudovsky points out that it cost the government close to \$400,000 to generate each additional job in the iron and steel industry in Guayana and

moreover investment in these basic industries has little repercussion (i.e. multiplier effects) on the remainder of the manufacturing sector (Chossudovsky, 1978, p. 19).

Supporters of the growth center strategy might claim that Guayana is still far from becoming an important growth center which would have significant 'spread effects' (see Travieso, 1972). In fact the Guayana development has proven to evolve closer to the growth pole ideas with two main

sectors - the iron & steel industry and the aluminum industry which have played the role of 'propulsive' industries in the region.

Rodwin had earlier commented on the negligence of social issues in the program which were of secondary importance to the planners (Rodwin, 1969). While for the Venezuelan Investment Fund the CVG lacks economic efficiency, for the Confederation of Venezuelan Workers:

there must be no repetition in the nationalized story of what happened in the Corporacion Venezolana de Guayana; this company had great success in terms of productivity and the volume of its production but it can hardly be denied that it failed to take account of the basic social and economic factors of man's existence, and did nothing about the standards of living or the labour conditions of its workers (Betancourt, 1978, p. 190).

Such a strong statement is not however fully justified. Negrón concludes that Guayana is in reality a national rather than regional program without any regional representation (Negrón, 1978).

While the Guayana project was based on the extremely rich mineral resources and, as noted by Odell

one is entitled to describe (Guayana program)... as a 'somewhat easy' first step because the resource base for its development was so outstanding and its long-term economic viability was so apparent (Odell, 1973, p. 236).

nevertheless, its implementation has not proven to be easy at all.

One of the main problems in execution of the program was the lack of knowledge and experience in development planning. The project itself was a major challenge to the Venezuelan capabilities. At the initial stage the planners had to rely on foreign expertise but final decisions were made by the Venezuelans. Guayana was to become a symbol of a new,

healthy national industrial development which would free Venezuela from foreign dependence and pave the way for similar future projects. The role of foreign consultancy has been officially camouflaged, as the reliance on foreign expertise might have destroyed the 'fully national' image of the program.

The CVG has tried to promote a strategy of 'balanced growth' but instead imbalances have been created and the region's experience has been closer to Hirschman's 'unbalanced growth'. Guayana has not reached either the stage of self-sustained growth as it continuously requires huge funds mainly from public sources.

The CVG has not been very successful in persuading the private sector to invest more in the regional development while, at the same time, direct foreign investments were discouraged by the official government policies and the Decision 24 of the Andean Pact. The full success of the Guayana development thus ultimately depended on the harmonisation of the interests and actions of public and private sectors, a process which has proven to be very difficult as each one of them has continued to operate within different economic spaces and has been motivated by different factors. It seems that the planners were too optimistic about Guayana's development potential and the voluntary cooperation of other investors. Besides serious delays in some major programs administered by the CVG, including hydro-electricity and the iron & steel industry have caused a chain reaction and further postponment of other projects which were inter-related. For example the pulp & paper industry has been at a standstill since the early 1960s.

The CVG has also suffered from the lack of skilled personnel to prepare all studies that were needed for the complex development of the region. Alamo Blanco & Ganz have argued that

while heavy industry was relatively well studied and programmed, with feasibility studies in every important field, a number of key areas have been neglected. These include agriculture and light industry. Tropical agriculture in an arid region with a granite shield dating from the pre-Azoic era (before the beginning of life on earth and therefore lacking in organic matter) is an extremely chancy thing (Alamo Blanco & Ganz, 1969, p. 89).

The development agency has not paid enough attention to the technology choices for the new regional industries, nor has it contributed much to the 'assimilation', 'absorption' and 'adaptation' of the imported technologies. It was not well conceived that the 'real' transfer of technology was essential for the self-supported growth of the new center. The technology decisions in Guayana's development were of secondary importance to the planners and many industrial projects used the U.S. prices to determine their rentability, as no other reliable information had been available in the country.

One could argue that the Guayana development has actually created many social problems which did not exist before in the region. Prior to 1960 the basic services for the relatively small population had been supplied by a few local enterprises, mainly the subsidiaries of the American MNCs operating in the iron industry, the U.S. Steel operating as Orinoco Mining and Bethlehem Steel as Venezuelan Iron Mines. With the creation of the CVG and the accelerated growth of the new regional center, national problems

have been transplanted to Guayana, problems which have been beyond the power and control of the CVG, such as high costs and deficit of housing, lack of skilled labor, managerial inefficiency, labor attitudes and consumption patterns. These problems have occurred with relatively greater intensity in Guayana than in other regions. In fact shanty towns have spread all over San Felix thus confirming the Venezuelan and Latin American character of the new development and generating pressing need for more action to solve this national problem.

The CVG's experience has indicated that even a solution to local regional problems may not be possible through a single regional program but requires the cooperation of other development agents. While some progress has been made in harmonization of interests and actions with other public agencies, cooperation with regional authorities and the local population has been kept at minimum. The perceptions of the local people have in fact differed from their 'Caracas' planners. Peattie claims that

the CVG thought it better not to expose its conceptions and plans for urban development to the people of the area until those plans were complete and definite (Peattie, 1969, p. 454).

The development agency has been also challenged by the Regional Municipality which

claimed that the CVG wanted to transfer to the city the deficit operating activities (such as low-cost housing, the water system, and garbage collection) that represented a financial burden while retaining the profit-making operations (such as the commercial center, hotels, medium- and high-cost housing) (Corrada, 1969, p. 344).

On the other hand there are also many positive aspects to the Guayana development program. It has shown that regional strategies may benefit from different institutional frameworks which promote development of peripheral regions. The CVG was capable of creating some new independent economic spaces which, gradually, have changed the spatial organization of not only one region but affected also the rest of the country. It has contributed significantly to the increased harmonization of policies at the government level and has initiated synchronization processes with foreign capital through direct cooperation in joint industrial projects. The foreign firms have played an important role in Guayana's development not as suppliers of capital but rather as suppliers of technologies, know-how and expertise, even in the case of wholly public-owned investments, as was the case in the iron & steel industry and hydro-facilities.

The success of the CVG can be measured in part by its very survival and its continuous operation since 1960 while previous regional policies and several institutions were abolished, including the Office of Special Studies (1953-1958) and the Venezuelan Iron and Steel Institute (1958-1960). Its contribution to promoting regional growth, despite its detractors, is unquestionable. The CVG has not only played a role of the main development agent in the region though its headquarters have been located in Caracas, but it also has contributed to the creation of new regional development agents, such as public enterprises and joint ventures, which have been able to develop their own economic spaces, independent from the economic space of the CVG. The most important development agents

are CVG Electrificación del Caroni (EDELCA), responsible for huge hydroelectric projects in the Guayana Region, CVG Siderurgica del Orinoco (SIDOR), the country's major producer of steel and joint ventures with MNCs in the aluminum industry (see Table 41).

Richardson's evaluation of the Guayana project is positive as he claims that

from the point of view of efficient use of natural resources and the creation of an industrial complex in a thriving regional metropolis, i.e., in terms of benefits to the national economy as a whole, Ciudad Guayana has been quite successful. On the other hand, its local economic and social impacts have been much more dubious... (however) Despite its enclave characteristics and its adverse effects on the secondary pole of Ciudad Bolívar, 100 kilometers up the River Orinoco, Ciudad Guayana has transformed a frontier region into an integral part of the national economy, and its links with its hinterland should be achieved in time (Richardson & Richardson, 1975, p. 170 & p. 173).

To Gilbert (1974) the Venezuelan experience has proven that it pays more for a developing country to process natural resources in the country rather than export them directly, but he is also aware of the fact that only few nations could afford similar investment projects which involve an almost unlimited supply of capital. Dinkelspiel draws attention to the great potential of a developing country to adapt modern technological structures which he sees as a necessary step towards progress in regional development:

Economic development, the CVG's experience would seem to indicate, involves not so much the destruction of traditional society by modern technology, as the infiltration and eventual capture of modern technology by pre-existing cultures. To have accommodated successfully modern and traditional social structures, to have bridged successfully the interface between more and less advanced levels of technology, is perhaps, the CVG's most significant achievement. In the uncertainties

TABLE 41

CVC'S SUBSIDIARIES AND MIXED ENTERPRISES

	Established	Sector	Initial Social Capital	Actual Social Capital	Thousands Bolivars			
					SOCIAL CAPITAL (ACTUAL, I.E. 1977-78)		PRIVATE	
					C.V.G.	PUBLIC	F.I.V.	Local Foreign
C.V.G. Ferronera Orinoco, C.A.	10/12/75	Mining	750,000	750,000	-	-	-	-
C.V.G. Electrificación del Caroni (EDELCA)	29/07/63	Electr. Gas & Wat. Manuf.	514,000	5,550,000	3,626,000	1,924,000	-	-
C.V.G. Siderurgica del Orinoco, C.A. (SIDOR)	01/04/64	Manuf.	200,000	9,350,000	5,300,000	4,050,000	-	-
Industria Venezolana del Aluminio (VENALUM)	31/08/73	Manuf.	34,000	550,000	187,550	252,450	-	110,000
Minerales Ordaz, C.A. (MINORCA)	03/11/67	Mining	22,500	22,500	11,475	-	-	11,025
Interamericana de Aluminio, C.A. (INTERALUMINA)	25/11/77	Manuf.	750,000	750,000	150,000	487,500	-	112,500
C.V.G. Internacional	20/09/78	Services	1,000	1,000	1,000	-	-	-
Aluminio del Caroni, S.A. (ALCASA)	16/02/61	Manuf.	50,000	165,000	82,500	-	-	82,500
Cementos Guayana, S.A.	12/05/67	Manuf.	12,000	12,000	3,000	-	-	9,000
C.A. Pulpa Y Papel Guayana	07/07/65	Manuf.	1,000	1,000	400	-	-	600
Puerto de Hierro, S.A.	24/09/65	Services	450	450	225	-	-	225
Fior de Venezuela, S.A.	03/08/73	Manuf.	80,000	130,000	43,333	-	43,327	43,340
Venezolana de Ferroatleaciones, S.A. (VENBOZEL)	09/11/73	Manuf.	1,000	65,000	10,000	22,499	7,500	25,001
Sociedad Financiera Atlantica, C.A.	09/04/74	Services	10,000	10,000	1,500	-	8,500	-
Metalmeg, S.A.	23/02/72	Manuf.	6,500	12,500	6,000	-	1,250	5,250
Fabrica Nacional de Tractores y Motores, S.A. (FAMATRACTO)	04/05/77	Manuf.	10,000	50,000	22,500	-	17,500	10,000
Bauxiven	/12/79	Mining					199, 990	

Source: based on information from 1) C.V.G., Sub-Gerencia de Desarrollo Organizacional & CVC, DEPI, Estadísticas de la Region Guayana, Diciembre 1978, Caracas, 1980; 2) C.V.G., Presupuesto 1980, DEPI, CARACAS, 1980; 3) Qs, 1980.

and enormous strains of national development this is no small accomplishment (Dinkelspiel, 1970, p. 79).

However Dinkelspiel's comments tend to distort the role of the CVG and it is also doubtful that any traditional social structures existed in Ciudad Guayana as most of the city's population immigrated from other parts of the country.

Speculations about the CVG's Future

If the main concepts of synchronized growth hold true, it seems inevitable that the role of the CVG as a development agent will diminish, as it becomes less effective, but it still should retain and even strengthen its position in synchronization processes. At the same time development agents created by the CVG (Table 41) will become more important and will be playing leading role in regional development. They have already expanded their economic spaces to such a degree that they undermine the dominating position of the CVG in the region. If they do so it is because they have an advantage over the CVG as they are capable to replace the CVG in satisfying regional objectives in more efficient form than the CVG which has become more 'bureaucratic' with too many functions and less power than at the initial stage of Guayana's development.

The CVG's future has been additionally endangered by the growing importance of yet another institution - The Venezuelan Investment Fund (VIF or FIV). The FIV (Fondo de Inversiones de Venezuela) was created in

1974, a year of record oil revenues, with two main objectives:

- a. to invest in long term projects which will help to diversify the Venezuelan economy and reduce dependence upon oil;
- b. to invest part of the revenues overseas, through foreign banks, and thus maintain their real value (V.B.O., 1976, p. 27).

In 1978 the FIV's total assets reached almost Bs 30.6 billion, close to Can. \$ 7.8 billion, of which almost two thirds was invested in the local market (Table 42). Because of its financial power the FIV has started to play major role in shaping the country's investment pattern. Back in 1975 it listed a number of priority projects which would receive its financing in 1975-1980, such as petrochemicals, oil refining, hydroelectric power, iron & steel industry, aluminum smelting, shipbuilding and shipyards, coal mining, railways and pulp & paper production (Table 43).

The CVG has become dependent on the FIV's financing to execute its own development plans. In the period 1975-1980 the CVG was to receive over Bs 14 billion from the FIV. The Investment Fund has been also directly involved in Guayana's development through becoming a partner on a number of joint ventures in the region. In 1978 it invested 4,627 million of Bolivars in the Guayana's manufacturing sector (Anuario Estadístico, 1980, p. 375), which constituted almost 97 per cent of the FIV's total industrial investments in the same year.

It is difficult at this stage and much too early to assess the role of this new partner in regional development, but it certainly changes the power play between government agencies and affects the position of the CVG.

TABLE 42

ALLOCATION OF FUNDS AND INCOMES OF THE VENEZUELAN
INVESTMENT FUND (FIV)

	Millions of Bolivars	
	1977	1978
1. Allocation of Funds		
Foreign Markets	16,772	11,521
Local Market	11,501	19,062
Total	28,273	30,583
2. Incomes		
Foreign Sources	1,085	963
Local Market	832	1,438
Total	1,917	2,401

Source: Anuario Estadístico, 1980, p. 578 &
BCV, Informe Económico 1978.

TABLE 43

ALLOCATION OF FUNDS OF THE VENEZUELAN INVESTMENT
FUND IN MANUFACTURING SECTOR (1976 - 78)

	In Millions of Bolivars		
	1976	1977	1978
Iron & Steel Industry	1,964	2,735	3,714
Sidor	1,964	2,732	3,713
Acelcar	-	3	1
Aluminum	211	832	891
Alcasa	211	82	6
Venalum	-	750	783
Interalumina	-	-	102
Shipbuilding	57	59	2
Cement	5	28	146
Other	-	-	22
Total	2,237	3,654	4,775

Source: . Anuario Estadístico, 1980, p. 374;

BCV, Informe Económico, 1978.

One of the positive outcomes of the FIV's existence could be the reestablishment of the profitability criteria or what we called before a 'modified' market mechanism much needed in the Venezuelan regional development. The FIV's decisions and financing are based mainly on 'economic efficiency' of the new investment projects. The CVG's plans have to comply with such criteria in order to receive further support and funding from the Investment Fund. The breaking of the CVG's monopoly should eliminate the waste of regional resources and reduce 'unnecessary bureaucracy' which has been finding ground within this development agency over the years. It should also release more information to the public about operations of the CVG.

The interests of regional development call for new forms of cooperation and harmonization of interests between the CVG and FIV as both of them continue to operate within different economic spaces. The confrontation may be potentially dangerous for the future development of Guayana.

It has recently been predicted that Guayana's economic growth will slow down in the 1980s. Under the conditions projected

Guayana's further substantial expansion after 1985 would lag, however, as the rest of Venezuela, drawing on Guayana products, moves ahead more rapidly. Guayana's post 1985 development would be characterized by growth, consolidation and balance. The manufacturing share of employment would double to one-third of total employment in the year 2000 (CVG - DEPI, 1978, p. 1-9).

Conclusion

Venezuela has made significant progress in promoting regional development and introducing certain forms of synchronized growth. The country has managed to create new 'potential' development agents such as CORDIPLAN (Planning Agency) and the CVG (Guayana Development Agency). The new institutions have encouraged synchronization processes on a limited scale and initiated institutional changes in the country.

Venezuela, following the recommendations of the Andean Pact agreement has also introduced substantial control over foreign investments, a policy which remains controversial. Moreover, an ambitious indigenous technology program has been adopted but there are signs that it has been divorced from the reality of the member-countries.

Special attention has been given to the Guayana development project which represents a unique experience in regional development. The major role in Guayana's growth has been played by one institution, the CVG, which was given responsibility for an integrated development of the planned region and the new city. The industrial program was introduced based on highly capital-intensive manufacturing sectors such as iron & steel, aluminum, metal products and machinery. Though some strictly economic goals have been reached in many areas, the lack of cooperation with other regional actors has seriously delayed implementation of social programs, for which the Development Agency

has been severely criticised.

Nevertheless, the CVG's role in Guayana's development should not be understated. The Development Agency has also created new prospective development agents which will probably take over its major functions in the near future.

Picture 1. El Paso, Belhwar State



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Picture 2 : Fleuve Guadiana (Puerto Ordaz)



Picture 3 : Ciudad Guayana (Puerto Ordaz)



L'espace, mot qui change de sens
avec la manière de voir et de
penser (Paul Valery).

CHAPTER V

INTERNATIONAL SPACE OF THE ALUMINUM INDUSTRY

The Guayana development paved the way for the Venezuelan entry into the international aluminum industry. The image of this industry as perceived by decision makers seemed to fit perfectly the country's needs and aspirations. Venezuela also had ambitions to become a major producer of aluminum in Latin America.

Before any justification of the Venezuelan decision to create its own aluminum industry in Guayana is made the nature of some relations within the international space of the aluminum industry will be introduced first, and the general international development of the industry will be reviewed. This should help us to understand :

- a. what kind of problems potential entrants and producers of the metal may be faced with,
- b. why the Venezuelan industry could not exist in isolation from the international scene, and
- c. why joint ventures are acceptable to the major aluminum MNCs.

The economic space of the aluminum industry in Western countries practically coincides with the particular economic spaces of the major aluminum MNCs.

It is clearly very sensitive to political factors and government interventions (Savey 1977 & 1981).

Main Characteristics of the Aluminum Industry

The world's production and consumption of aluminum have increased steadily since the Hall-Héroult process was first used in commercial production (Table 44). Today aluminum is one of the most heavily used materials, second only to iron and steel. It owes its growing popularity to its physical characteristics which assure:

- a. light weight, less than 50% of comparable heavy structures; aluminum has a density one third that of steel;
- b. corrosion resistance; aluminum surfaces are covered with a thin oxide film (layer of aluminum oxide) which has strong resistance to corrosive attack. This enables the use of aluminum in many corrosive and abrasive conditions;
- c. strength and toughness at low temperatures; the strength/weight ratio of the strongest aluminum alloys is among the highest available in commercial materials;
- d. low elastic modulus; the elastic modulus of aluminum is one third that of steel, therefore stresses due to impact, misfit and imposed deformations are low in aluminum structures;
- e. good electrical conductivity; weight for weight, the electrical conductivity of aluminum alloys is up to twice that of copper;
- f. good thermal conductivity and low thermal stresses; the coefficient of thermal expansion is twice that of steel;
- g. non magnetic;

ANNUAL WORLD PRODUCTION OF ALUMINUM

Year	Production In metric tons	Year	Production
1854	0.02	1889	71
1859	0.96	1890	180
1865	1.10		
1869	1.5	1891	330
1872	1.8	1892	480
1878	2.0	1893	720
1882	2.0	1894	1,240
1884	2.06	1895	1,430
1885	14.0	1896	1,800
1886	16.0	1897	3,400
1887	26.0	1898	4,100
1888	39.0	1899	6,000
	In metric kilotons		
1900	6.69	1938	581.3
1901	7.5	1939	703.7
1902	7.8	1940	780.4
1903	8.2		
1904	9.3	1941	1,029.2
1905	11.5	1942	1,384.8
1906	14.5	1943	1,932.6
1907	20.0	1944	1,696.6
1908	18.5	1945	823.0
1909	31.0	1946	775.0
1910	44.0	1947	1,141.0
		1948	1,210.0
1911	46	1949	1,280.0
1912	63	1950	1,506.9
1913	65		
1914	84	1951	1,807.6
1915	82	1952	2,032.3
1916	115	1953	2,453.9
1917	156	1954	2,820.4
1918	180	1955	3,104.7
1919	158	1956	3,332.7
1920	127.1	1957	3,389.4
		1958	3,546.7
1921	74.6	1959	4,085.9
1922	91.8	1960	4,537.2
1923	138.0		
1924	169.3	1961	4,587.4
1925	181.2	1962	4,983.9
1926	195.8	1963	5,400.8
1927	219.6	1964	6,054.9
1928	256.0	1965	6,586.1
1929	280.8	1966	7,208.7
1930	269.7	1967	7,933.1
		1968	8,515.0
1931	219.5	1969	9,459.3
1932	153.7	1970	10,257.0
1933	142.0		
1934	170.8	1971	10,936.0
1935	259.6	1972	11,649.0
1936	365.5	1973	12,707.3
1937	491.3	1974	13,810.1
		1975	12,693.2
		1976	13,202.1
		1977	14,327.1
		1978	14,745.4
		1979	15,230 (15,221.6)
		1980	16,300

Source: Grjotheim, Krohn, Malinovsky, Matiasovsky & Thonstad, 1977, p. 6, Table 60 & MW, 1981.

- h. non sparking;
- i. non toxic reaction; aluminum does not change the flavour, purity or color of food;
- j. high reflectivity;
- k. ease of fabrication and erection; aluminum can be formed, pierced, machined, sawn and sheared at high operating speeds;
- l. wide choice of finishing methods, such as chemical treatment; mechanical surface texturing, painting and porcelain enamelling; and
- m. low maintenance costs (Alcan, 1973 & 1980, Huggins, 1965; Altenpohl, 1980).

It is interesting to note that though aluminum is one of the major consumers of energy, as the production of 1 ton of aluminum requires almost seven times as much energy as 1 ton of steel, it is also energy-saving material in its final use. Thus rising energy costs have actually promoted wider use of aluminum, as for instance in the automotive industry, for its light weight. Aluminum is also one of the most recyclable materials, with minimal amounts of energy required for its secondary recovery, approximately only 5 per cent of the energy inputs in the original smelting or 0.8 kWh/kg.

Basic Technologies

The aluminum industry uses 'standard' technologies which are little affected by local conditions in any particular country. Those technologies are available in international markets and access to them does not create a serious obstacle for new investors.

Aluminum is produced in two stages from natural ores, basically bauxite which is its oxide. In some studies a bauxite stage is added, which involves mechanical process, mining and enrichment of ores (Brubaker, 1967; Higgins, 1965; and Charles River Associates, 1971).

Two stages in aluminum production are the alumina stage and the aluminum stage. Each one of them is characterized by different type of technology and often takes place in a different geographical location (Krutilla, 1955; Savey, 1977 & Auty, 1980).

The alumina stage consists of dissolving out the aluminum oxide - Al_2O_3 from other compounds, mainly iron oxide - Fe_2O_3 , with caustic soda. The composition of the most widely used bauxites is as follows :

approximately 60 per cent aluminum oxide - Al_2O_3 ;
 up to 28 per cent iron oxide - Fe_2O_3 ;
 up to 6 per cent silica - SiO_2 ;
 up to 3 per cent titania - TiO_2 ; and
 10 to 30 per cent chemically combined water - H_2O
 (Hegmann, 1978, p. 3).

Also other clays are used but on a smaller scale. For instance, Anaconda in the U.S. has produced alumina from clays with lower aluminum oxide content than bauxite. In the USSR, nepheline, - another ore, has been used and it is reported to give many by-products. Alcan has tested anorthosite, shales and other non-bauxite ores;

also Pechiney's H-plus process is designed to extract aluminum oxide from ores other than bauxite. Recently the Korean Institute of Science and Technology has developed a new process for extraction of alumina from the ash of coal briquettes, the so called Lime-Soda-Cal Sinter (LSC) process:

The composition of the ash of a typical coal briquette (used in Seoul) is 45% SiO_2 , 30% Al_2O_3 , and 10% C (UNIDO, 1980, p. 3).

In the alumina stage the following chemical processes are used:

- a) clarification, to separate sodium aluminate;
- b) decomposition, to eliminate sediments, and
- c) calcination, which gives a white powder known as alumina.

The most popular process used in the production of alumina is Bayer's chemical process, though it may be modified in several ways (Huggins, 1965; Charles River Associates 1971, Savey, 1977). The cost of producing 1 metric ton of alumina is given in Table 45 (Estimates).

Alumina and alumina hydrates are used also by other industries, such as chemical, refractory, abrasives and ceramic industries.

The aluminum stage begins with alumina further treated with a flux (cryolite) by an electrolytic process. Nearly one hundred years have passed since P.L.T. Héroult in France /23.04.1886/ and C.M. Hall in the United States /09.07.1886/ developed independently the aluminum production process by electrolysis of a molten solution of alumina in cryolite and gave beginning to the commercial production of the metal on a large scale. Their process, apart from many technical improvements, has remained basically unchanged since its invention and is used by almost all producers of aluminum.

Table 45

Estimated Costs of Producing Alumina

American Bayer Alumina Process Cost, New Greenfield Capacity, "Concensus"
Input Estimates (1976 dollars per metric ton)

<u>Item</u>	<u>Cost</u>
Labor: 2.1 hours @ \$7.29	15.31
Utilities	
Electricity: 250 kwh @ \$0.015	3.75
Steam: 8.00 @ \$1.50 MMBTU	12.00
Water coding: 2.76 M. gal @ \$0.05	0.14
Water, process: 2.2 M. gal @ \$0.50	1.10
Fuel: 5.00 MMBTU @ \$2.25	11.25
Total	28.24
Raw Materials	
Limestone: 075 tons @ \$ 7.50	0.56
Caustic: 075 tons @ \$ 160.00	12.00
Starch: 0066 tons @ \$ 208.72	1.38
Total	13.94
Maintenance materials: 2.5 % of replacement cost of installed equipment	11.25
Overhead: 50% of direct labor and maintenance	13.28
Fixed Costs	
Taxes: 1% of total plant cost	4.50
Insurance: 1% of fixed capital cost	4.50
Annualized capital costs (interest and depreciation): 12% plant cost	54.00
Total	63.00
Total processing cost	145.02
Cost of bauxite: 2.3 tons @ \$ 23.00	52.90
Total cost of aluminum	<u>197.92</u>

Source: Charles River Associates, 1980, p. 35.

Alumina is dissolved in a molten cryolite electrolyte in special electrolytic cells. There are two kinds of anode cells used by the majority of the world's aluminum smelters: the 'Söderberg' and 'pre-baked' anodes (See Figures 4 and 5 - Appendix III).

In the former case, the granular carbon raw material is bonded into a solid composite by pyrolysis of pitch while utilizing the heat of the electrolytic cell. Pre-baked anodes have the coke particles bonded in a solid carbon mass with pitch binder in a separate baking before introduction to the cell. Pre-baked anodes have the advantage that better compaction and quality control can be maintained, which leads to a lowering in carbon consumption as well as making it easier to control the fumes produced during the baking of the anodes (Grjotheim, 1980, p. 7).

Aluminum oxide is heated to a very high temperature by electric current. A potline of 80 to 240 electrolytic cells requires a current of 50,000 to 150,000 amperes.

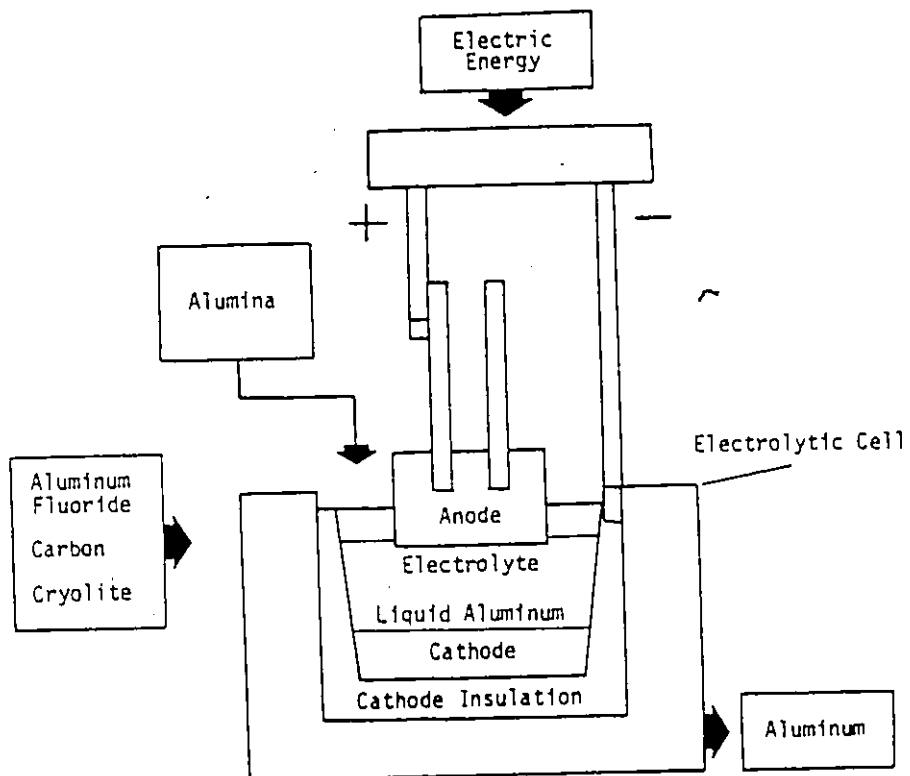
The larger cells required in plants designed for 150,000 amperes are more difficult to operate and service, and although they save on labour costs the capital cost is greater for this reason the preferred amperage range is 70,000 to 80,000 (UNIDO, 1969, p. 39).

High temperatures are needed to separate the oxygen, which reacts with the carbon anode, and produces the pure metal, aluminum (see Figure 6). The basic process can be described as follows:



Aluminum ingot is usually further treated to reduce impurities, though this step is not included for aluminum pig. Aluminum is also alloyed with other metals, like lead, chromium, boron, etc., to reach the desired physical characteristics.

Figure 6: Schematic Diagram for Aluminum Smelting



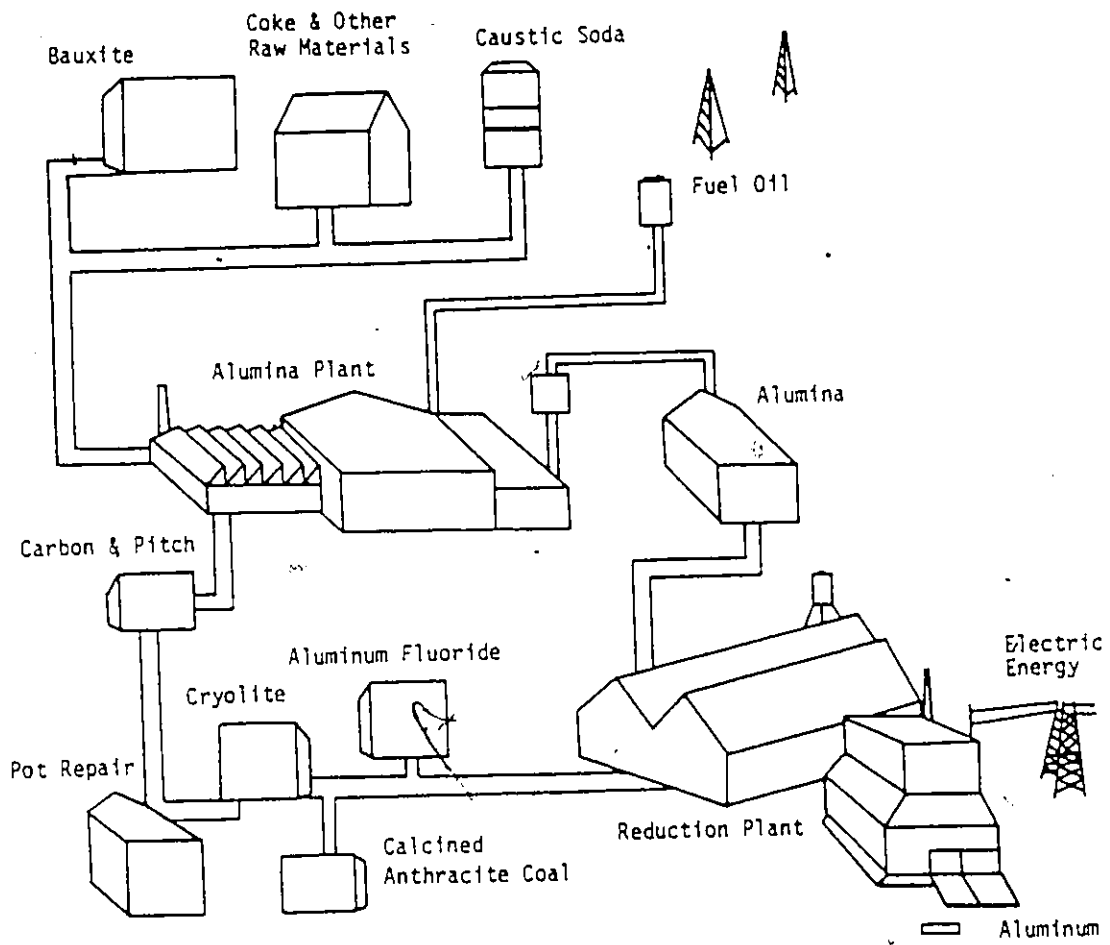
The typical inputs in the production process to produce 1 ton of aluminum include:

- a. alumina stage: bauxite - 4 to 5 tons, caustic soda - 0.25 to 0.50 ton, fuel oil - 0.25 ton, lignite - 0.5 ton; with the end product alumina - 2 tons;
 - b. aluminum stage: alumina - 2 tons, coke - 0.5 ton, pitch - 0.25 ton, cryolite - 0.03 ton, aluminum fluoride - 0.03 ton and electric energy - 14,000 to 18,000 kwh; which gives 1 ton of aluminum (see Figure 7).
- As can be noticed from the above list of the required inputs and production costs of aluminum (Table 46) the smelting process depends on large amounts of energy. Thus to operate a smelter a constant source of electricity is needed 24 hours per day.

The only cheap and safe source of electric energy known till today is that produced by hydro-power generation, although nuclear energy seemed to be once a solution as well. As could be expected, cheap electricity is not in many cases available in locations close to the source of raw materials (bauxite). It is not necessarily found either in the vicinity of the main markets for aluminum.

Aluminum smelting is a highly capital intensive industry. It has been estimated that in 1976-78 the average capital requirements per ton of primary aluminum for new smelters in the U.S. were about \$1,730, while in many developing countries the same costs were twice or three times higher (Woods & Burrows, 1980, p. 40).

Figure 7 : Production of Aluminum from Bauxite



Source : Qs, 1980 (Alcasa)

Table 46

Estimated Costs of Smelting Aluminum

Input Costs of a 100,000 tons per year Aluminum Reduction Plant (1976 dollars per metric ton of aluminum)

<u>Input</u>	<u>Cost</u>
Fluorides (55 kg. @ \$ 0.482)	26.51
Pitch (.14 m. ton @ \$ 91.80)	12.85
Thermal energy (7.3 MMBTU @ \$ 1.50)	10.95
Coke (.5 m. tons @ \$ 106)	53.00
Power (15,200 kwh @ \$ 0.015)	228.00
Labor (10 man hours @ \$ 7.29)	72.90
Maintenance materials (2.5% of investment)	43.25
Overhead (50% of labor and maintenance)	58.08
Local taxes and insurance (2% of investment)	34.60
Annualised capital costs (interest and depreciation) (12% of total plant costs),	207.60
Total processing cost	747.74
Alumina (1.93 tons)	381.99
Total costs	1,129.73

Source: Charles River Associates, 1980, p. 39.

Structure of the International
Aluminum Industry

The aluminum industry is one of the most vertically and horizontally integrated industries dominated by a few MNCs in the Western World.

The most important companies are:

1. Aluminum Company of America (Alcoa)
2. Alcan Aluminum Limited (Alcan)
3. Reynolds Metals Co.
4. Kaiser Aluminum & Chemical Corp.
5. Swiss Aluminum Ltd. (Alusuisse), and
6. Pechiney Ugine Kuhlmann.

Alcoa is the world's largest aluminum producer with an estimated 15 per cent world market share (Can. Bus., November 1980, p. 86). The company's shipments of aluminum totaled 1,886,000 tons in 1979 (Moody's IM, 1980, p. 560). Alcan has an estimated 12 per cent share of the world market and ranks second in aluminum smelting with total rated capacity of 1,347,000 tons per year (Moody's IM, 1980, p. 2556). Reynolds is the third largest producer of aluminum in the world and in 1979 its production reached 1,093,400 tons of primary aluminum (Moody's IM, 1980, p. 3946, see Table 47). In 1980 Alcan had the highest net incomes of \$ 524 million, Alcoa was second with \$ 470 million and Kaiser earned more than Reynolds, with \$ 248 million versus \$ 180 million for the latter (MW, January 26, 1981).

There are at least several reasons for the heavy concentration of

Table 47

Bauxite, Alumina and Aluminum Capacities of
Major Integrated Firms (millions of short
tons of aluminum equivalents)

Company	Bauxite		Alumina		Aluminum	
	1969	1974	1969	1974	1969	1974
Alcan	1.732	1.475	1.776	2.162	1,698	2,216
Alcoa	2.008	3.562	2,091	3,688	1,638	2,008
Reynolds	1.824	1.632	1.109	1.746	1,142	1,504
Kaiser,	2.388	3.967	1,294	1,572	0,939	1,172
Pechiney	0.623	.783	0,800	1,280	0,788	1,066
Alusuisse	0.223	1.042	0.239	0.885	0.426	0.823
Total	9.486	12,460	7.309	11,359	6.631	8.788

Source: Charles River Associates, 1980, p. 74.

aluminum industry within a few companies.

In the past the possession of patent rights secured growth of major aluminum producers (Brown & Butler, 1968). In the United States it was Alcoa, formerly Pittsburgh Reduction Company, which used the Hall patent exclusively and was the sole producer of alumina and aluminum in the country until the 1940s. (Wallace, 1937, Peck, 1961).

In Europe Alusuisse acquired the Héroult patent rights, but it was Pechiney of France which first used the process on a licence from Alusuisse and soon became Europe's largest producer. Though Alusuisse granted licences to other firms, aluminum cartels which dominated the European aluminum industry until 1939 have limited the spread of the Héroult process. (Marlio, 1947; Peck, 1961; Charles River Associates, 1971). With the end of the aluminum cartels' era, the industry theoretically opened its doors to new investors.

In North America the changes in the structure of the aluminum industry were initiated by the United States government which was interested in growth of the industry during and after World War II. Aluminum was treated as a 'defense supporting' investment and the monopoly of Alcoa was not viewed as a positive phenomenon for the further expansion of the strategic metal (Charles River Associates, 1971). The government built its own smelters, during the war, which were initially operated with Alcoa's assistance.

In 1946 the government decided to sell on very favorable conditions its reduction plants to Kaiser Aluminum & Chemical Corporation, formerly Permanente Metals Corporation and to Reynolds Metals Company.

This decision ended Alcoa's monopoly in the United States and brought two new companies into a narrow circle of the world's aluminum industry. Alcoa was not allowed to purchase public smelters though the U.S. government had serious problems with attracting the new investors. Both Kaiser & Reynolds received special incentives, such as amortisation certificates and guarantees for purchase of all aluminum which could not be commercially sold by the new producers. As a result

in the early 1950's, more than 2 million tons of U.S. produced primary aluminum was bought by the GSA (General Services Administration's strategic stockpiles) (Brown and Butler, 1968, p: 18).

Alcoa agreed to supply Reynolds and Kaiser with raw materials, but the new producers soon realized how important vertical integration in the aluminum industry was and they undertook large investments to build their own raw material bases. The U.S. government additionally encouraged vertical integration for strategic reasons.

In 1950 the anti-trust proceedings against Alcoa ended with the final separation of Alcan from Alcoa. Alcan had already expanded its international operations since 1928 and managed to penetrate European markets (Brubaker, 1967).

Since World War II, even when the aluminum patents became available to other potential investors, the list of newcomers has been rather limited and has not significantly affected the leading role of the six main companies. This would suggest that yet another group of factors tend to favour the heavy integration of the industry.

The very high capital costs and relatively low returns on investments have strengthened the existing institutional structure. Only large companies seemed to have adequate financial resources to be able to make long-term investments. Brown and Butler have observed that

the return on net worth in the U.S. aluminum industry was only 5.9 per cent in 1960 compared with about 12 per cent for the leading companies in other industries... Since at the time the opportunity cost of capital in world markets was about 8 per cent, the scope of non-integrated activities in the U.S. must be very limited, and the attraction to new investors absolutely nil (Brown & Butler, 1968, p. 146).

Because of high investment costs, low returns and strong competition new entries into the international aluminum industry and the growth of existing producers would not have been possible without support from local governments. Even in France, the first producer of aluminum, Pechiney has benefited from high tariffs and low rates for electricity (Brubaker, 1967). In Norway and West Germany the government have been cooperating with private capital in order to promote the growth of their national aluminum industries. The West German company Vereinigte Aluminium - Werke AG (VAW) is government owned and so is the Norwegian Aardal og Sunndal Verk A/S.

In the expansion of the aluminum companies, the size of market has played an important role, thus promoting growth of only few large companies. Woods and Burrows have claimed that

the size of the aluminum market until the 1950s was too small to support more than a few efficient size firms. The minimum efficient scale of an alumina plant appears to be at least 330,000 short tons, equivalent to 165,000 short tons of aluminum, unless the entrant is protected by special tariff

barriers, high transport costs, or other similar market impediments;.. By 1939 world output was 676,000 short tons about equal to the output of four efficient producers (Woods & Burrows, 1980, p. 67)..

The world's major producers are involved in all stages of aluminum production starting with mining and processing of bauxite, transportation of bauxite and alumina, production of alumina from bauxites, to reduction of alumina to aluminum. They further process aluminum and aluminum alloys into variety of semi finished and finished products, as well as manufacture other chemicals. Pechiney Ugine Kuhlmann is also the major producer of stainless steel in Europe.

To illustrate the degree of integration of the aluminum industry let us quote Clarfield's example:

look at the steps involved in turning Jamaican bauxite into Reynolds Wrap... Today Reynolds Jamaica Mines Ltd. owns 67,000 acres of bauxite land in Jamaica - 2.5 per cent of the entire island - which it mines with Reynolds-owned equipment. The bauxite is shipped on a Reynolds owned six-mile long overhead tramway to the Reynolds dock at Ocho Rios. There the bauxite is loaded aboard a bulk carrier of the Caribbean Steamship Company, owned 100 per cent by Reynolds, and shipped to Reynolds' alumina refinery at Corpus Christi, Texas. The refined alumina is then transferred to Reynolds San Patricio, Texas, reduction plant, where it is melted into aluminum and cast into sheet ingot. This sheet ingot may be shipped to the Reynolds sheet and plate plant at McCook, Ill., to be processed into reroll stock and then shipped to the Reynolds foil mill at Louisville, Ky., where it is rolled down to household foil, packaged, and delivered to supermarkets all over the US to be sold as Reynolds Wrap (Clarfield et al., 1975, as quoted by Rangarajan, 1978, pp. 165-166).

Similar practices have been common among other MNCs operating in the aluminum industry. For example Alcan Aluminium Ltd. owns and operates port facilities

in Jamaica, Trinidad and the United Kingdom, as well as in Canada at Port Alfred, Que., and Kitimat, B.C., plus a railway in Eastern Canada, for the handling of bauxite, alumina, aluminum and related products. It has three main shipping subsidiaries which transport Alcan's products and required materials among different countries. Alcan, Alcoa, Reynolds and Alusuisse have their own power generating facilities which assure relatively lower and stable costs of electric energy.

In the early 1970s the six aluminum giants owned:

60 per cent of the non-communist world's bauxite mining capacity, 70 per cent of its alumina capacity and 63 per cent of its aluminum smelting capacity (US Council on International Economic Policy, 1975, after Rangarajan, 1978, p. 165, see also Savey, 1977).

For the six MNCs backward integration has been essential to secure supply of raw materials necessary for aluminum smelting and to have control over their production costs. Bauxite and alumina were not traded on commodity exchanges and this has theoretically enabled the MNCs to use 'transfer pricing' to meet their global objectives.

Brubaker has argued that

In view of the heavy cost of plant in the industry firms are reluctant to be dependent on competitors or other outside sources for their raw materials, for any extended shortage can be disastrous (Brubaker, 1967, p. 109).

Indeed Anaconda, one of the world's largest copper producers and new aluminum investor, was unable to expand its aluminum smelting capacity for several years because of the problems encountered with supply and high costs of alumina (Charles River Associates, 1971). In 1969 Anaconda decided to enter into a joint venture Alumina Partners of Jamaica to assure its

supplies of alumina. The company has been also investigating new production processes which use other clays.

Forward integration has secured outlets for aluminum smelting. All six MNCs have been involved in aluminum fabrication and production of various final products and in that sense they have promoted further use of aluminum by different customers. The MNCs have been also engaged in popularization of new applications for the metal. The diversification of output and sales has been an important factor in market expansion of aluminum corporations. The aluminum MNCs have played an important role not only in stimulating demand for the metal but also in stabilizing its prices. Brubaker notes that

Alcan, as the world's largest exporter and certainly one of the lowest cost producers, was recognized as playing a key role in stabilizing the world price within the context of a policy of balancing long-term demand and supply at a price that would attract expansion capital to the industry (Brubaker, 1967, p. 115 and see also Table 48 and Figure 8).

The emergence of new aluminum producers both in industrialized and in developing countries has already affected the dominating position of the six aluminum giants. Woods and Burrows have assessed that

During the 1953-74 period, Alcoa's share fell from 22.6 to 15.5 per cent /market share -aluminum capacity/, Kaiser's share fell from 15.6 to 9.0 per cent, Reynolds' from 13.9 to 11.6 per cent and Alcan's from 25.7 per cent to 17.1 per cent. On the other hand, Pechiney's share increased from 5.1 to 8.2 per cent, and Alsuisse's from 4.3 to 6.3 per cent (Woods and Burrows, 1980, p. 72; see Table 50).

In 1974 Australia, Guinea, Guyana, Jamaica, Sierra Leone, Surinam and Yugoslavia established the International Bauxite Association

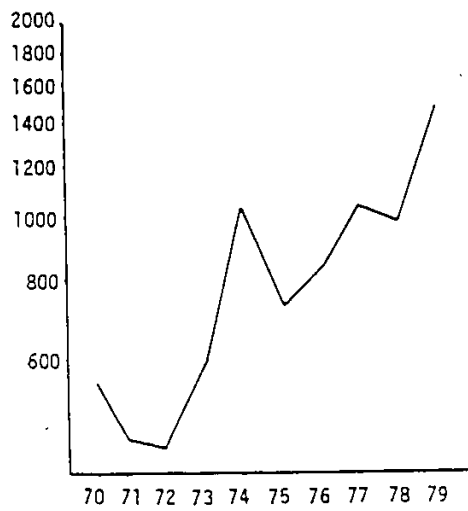
TABLE 48

COMPARISON OF ALUMINUM COSTS WITH LIST PRICE OF AL. (cents per pound)

Year	List Price of Aluminum	Average Long-Run Production Cost of Al.
1935	21c	
1940	18c	(Brown & Butler, 1968, p. 148)
1945	15c	Estimates
1947	15.00	12.4
1948	15.74	13.8
1949	17.00	13.6
1950	17.69	13.9
1951	19.00	15.3
1952	19.40	15.3
1953	20.93	16.6
1954	21.78	16.7
1955	23.67	16.2
1956	26.01	17.1
1957	27.52	18.0
1958	26.89	17.6
1959	26.85	18.1
1960	27.23	18.2
1961	25.46	18.0
1962	23.88	18.0
1963	23.68	18.0
1964	23.72	18.3
1965	24.50	18.4
1966	24.50	19.0
1967	24.98	19.6
1968	25.57	20.4
1969	27.18	21.2
1970	28.72	22.9
1971	29.00	24.9
1972	26.45	25.2
1973	25.33	27.2
1974	34.69	38.0
1975	39.79	42.4
1976	44.34	51.1

Source: Charles River Associates, 1980, pp. 76-77.

Figure 8 : World Aluminum Prices (International Ingot Spot Price) *



* US \$ Per Tonne

Source : Alcan Aluminium Ltd., 1980, p. 15

(IBA) in order to gain more control over prices and use of their own resources. Four other countries have been added since 1974, the Dominican Republic, Haiti, Ghana and Indonesia. The IBA accounts for close to 80 per cent of all bauxite sales in the Western World. Its ultimate goal is not necessarily to curb exports of bauxite to aluminum producers but rather to control international prices and encourage development of local aluminum industries. This may seriously undermine the position of traditional aluminum producers. Most of the countries belonging to the IBA have already significantly increased their prices through export taxes.

For example, Jamaica increased its taxes per metric ton from an average of approximately \$1.80 to around \$15.30 (as shipped) by 1976. Following Jamaica's lead the Dominican Republic, Haiti and Guyana increased their taxes to approximately the same level as Jamaica's. The tax rates of all four countries are linked to the average realized price of primary aluminum (Woods & Burrows, 1980, p. 3).

The new export taxes have raised the price of bauxite from those countries to the United States, Canada and Europe over 100 per cent.

The creation of IBA has been followed by a trend towards further 'divestment' and 'nationalization' of the aluminum industry in developing countries (Williams, 1975) supported by several theorists. Girvan has advocated 'nationalization' as a panacea for all development problems.

In the bauxite sector, ownership and decision-making have to be transferred from the multinational corporations to the national economy. This is necessary so as to put the resource basically to the service of the national economy; for the development of an aluminium industry, for the development of other using, supplying and allied industries, for the development of an appropriate technology and for the use of the enormous surplus - realized as foreign exchange - to which

the industry gives rise (Girvan, 1971).

Girvan does not seem to understand that such a strategy may be very dangerous and may bear high risks and costs for a developing nation.

The world's largest producers of aluminum have to accept the changing political climate in developing countries and the growing popularity of 'divestment policies'. Their own survival will depend on increased cooperation with local partners and harmonization of their global strategies through incorporation of regional interests.

The MNCs should be the first to take new initiatives if they do not want to witness further speed-up in nationalization processes. Reynolds had already to sell 51 per cent of its operations and all its land holdings in Jamaica to the Jamaican government in 1980. Alcan has been caught by Guyana's nationalization of its subsidiaries operating in that country. It also had to divest in Venezuela following the Decision 24 regulations.

It seems that the MNCs are not generally against industrial cooperation with local partners (Tables 49 - 55), as the number of joint ventures in the aluminum industry has increased dramatically since the late 1960s. They have enabled the MNCs to penetrate new markets and expand their capacities at reduced costs and risks. At the same time joint ventures opened the aluminum industry to smaller independent investors.

For developing countries which can offer comparative advantage for the aluminum industry, the international industrial cooperation through joint ventures seems more advantageous than nationalization, since most of those countries lack technology and large enough markets. Woods and Burrows

TABLE 49

ALUMINUM COMPANY OF AMERICA

Principal Subsidiaries & Affiliates

Adam Metal Supply, Inc. (N.Y.)	Furukawa Aluminum Co. Ltd. (Japan) (33%)
Alcas Cutlery Corp. (N.Y.)	H C. Products Co. (Del.)
Alcoa Building Products, Inc., (Pa.)	Halco (Mining) Inc. (Del.) (27%)
Alcoa Chemie Nederland B.V. (Netherlands)	Compagnie des Bauxites de Guinee (CGB) (Del.) (51%)
Alcoa Deutschland GmbH (W. Germany)	Inversiones Alcoa, S.A. (Venezuela)
Alcoa Exploration Co. (Del.)	Aco, Sociedad Anonima (Venezuela) (42%)
Alcoa France S.A.R.L. (France)	Inversiones Araco Compania Anonima (Venezuela) (80%)
Alcoa Generating Corp. (Ind.)	L.W. Nash Company (Del.)
Alcoa Inter-America, Inc. (Del.)	Lib-Ore Steamship Company, Inc. (Liberia)
Alcoa International, Inc. (Panama)	Lincoln Manufacturing Company, Inc. (Ind.)
Alcoa International (Asia) Ltd., (Hong Kong)	Moralco Limited (Japan) (75%)
Alcoa Japan Ltd. (Japan)	Neumin Production Co. (Del.)
Alcoa Minerals of Jamaica, Inc. (Del.)	Northwest Alloys, Inc. (Del.)
Alcoa Nederland B.V. (Netherlands) (75%)	Pep Industries, Inc. (Tenn.)
Alcoa of Australia Ltd. (Australia) (51%)	Rea Magnet Wire Company, Inc. (Del.)
Alcoa Holdings Ltd. (Australia)	Shibasaki Seisakusho Ltd. (Japan) (51%)
Dowell Australia Ltd. (Australia) (50%)	The Stolle Corp. (O.)
Alcoa of Great Britain Ltd. (England) (75%)	Norcold, Inc. (Calif.)
Alcoa Manufacturing (G.B.) Ltd. (England)	Suriname Aluminum Co. (Del.)
International Alloys Ltd. (England)	Tapocco, Inc. (Tenn.)
Alcoa Properties, Inc. (Pa.)	Tifton Aluminum Co., Inc. (Del.)
Alcoa Ventures, Inc. (Del.)	Victoria Aluminum Co. (Del.)
Allegheny Center Associates (Pa.) (97%)	Wear-Ever Aluminum, Inc. (Del.)
Century City, Inc. (Del.)	Yadkin, Inc. (N.C.)
Jonathan's Landing, Inc. (Del.)	
Lot 8, Inc. (Del.)	
Delta Towers Joint Venture (Calif.) (50%)	
Wilpen, Inc. (Pa.)	
Alcoa Recycling Co. (Del.)	
Alcoa Steamship Co., Inc. (N.Y.)	
Alcomex, S.A. (Mexico)	
Aluminio, S.S. de C.V. (Mexico) (44%)	
American Powdered Metals Co. (Del.)	
Buckeye Molding Company (Del.)	
Companhia De Mineracao Santarem-Comisa (Brazil)	
Companhia Mineira de Aluminio - Alcominas (Brazil) (50%)	

Source: Moody's Industrial Manual, 1980, p. 560.

TABLE 50

PRINCIPAL SUBSIDIARY AND RELATED COMPANIES - ALCAN ALUMINIUM LTD.
 At 31 December 1979 - Fully owned unless the percentage of ownership is shown.

Operating CompaniesNorth America

Canada
 Aluminum Company of Canada Ltd
 Alcan Canada Products Limited
 Alcan Smelters and Chemicals Ltd
 Alcan-Price Extrusions Limited (50%)
 Revalax (1978) Inc.
 Roberval and Saguenay
 Railway Company, The
 Saguenay Shipping Limited
 Supreme Aluminum Industries Limited
 (26.27%)
 Vic Metal Corporation
United States
 Alcan Aluminum Corporation
 Luxfer USA Limited (80.66%)
Bermuda
 Alcan (Bermuda) Limited

Caribbean

Jamaica
 Alcan Jamaica Company *
 Alcan Products of Jamaica Limited
 Jamalcan (93%)
 Sproctons (Jamaica) Limited
Trinidad
 Chaguaramas Terminals Limited
 Geddes Grant Sproctons Industries
 Limited (49%)
 Sproctons (Trinidad) Limited

Latin America

Argentina
 Camesa S.A.
 Extrusion S.A. (65.1%)
Brazil
 Alcan Alumínio do Brasil S.A.
 Alumínio do Brasil Nordeste S.A.
 Mineração Rio do Norte S.A. (19%)
 Petrocoque S.A. (25.1%)
Colombia
 Alumínio Alcan de Colombia S.A. (49%)
Mexico
 Alcan Alumínio S.A. (48.7%)
Uruguay
 Alcan Alumínio del Uruguay S.A. (89.9%)
Venezuela
 Alumínio de Venezuela, C.A. (Alcaven)
 (49%)

Europe

Belgium
 Alcan Aluminium Raeren S.A.
France
 Aluminium Alcan de France
 Alcan Filage de Finitions
 S.A. des Bauxites et Alumines de
 Provence
 Technal France S.A. (75%)
Germany
 Alcan Aluminiumwerke GmbH
 Alcan Aluminiumwerk Nürnberg GmbH

Alcan Folien GmbH
 Aluminiumfolienwerk GmbH
 Aluminium Norf GmbH (50%)
 Cargo Van Fahrzeugwerk GmbH (50%)
Ireland
 Aughinish Alumina Limited (40%)
 Unidare Limited (25.5%)
Italy
 Alcan Alluminio Italiano S.p.A.
 Alcan S.p.A.
Netherlands
 Hunter Douglas N.V. (25.16%)
Spain
 Empresa Nacional del Aluminio
 S.A. (Endasa) (26.4%)
 Productos Aluminio de Consumo, S.A.
 (50%)
Switzerland
 Aluminiumwerke A.-G. Rorschach
United Kingdom
 Alcan Building Materials Limited (80.66%)
 Alcan Design Products Limited (60.5%)
 Alcan Ekro Limited (40.33%)
 Alcan Enfield Alloys Limited (40.33%)
 Alcan Extrusions Limited (80.66%)
 Alcan Foils Limited (80.66%)
 Alcan Lynemouth Limited (80.66%)
 Alcan Metal Centres Limited (80.66%)
 Alcan Plate Limited (80.66%)
 Alcan Polyfoil Limited (80.66%)
 Alcan Rain Water Products (80.66%)
 Alcan Safety Glass Limited (80.66%)
 Alcan Sheet Limited (80.66%)
 Alcan Transport Products Limited
 (80.66%)
 Alcan Windows Limited (80.66%)
 Alcan Wire Limited (80.66%)
 Bonalack Vehicles Limited (80.66%)
 Cargo Van Equipment Limited (50%)
 Coventry Metal Bars Limited (80.66%)
 Ian Proctor Metal Masts Limited (19.4%)
 Johnson & Eloy Aluminium
 Pigments Limited (29.1%)
 Luxfer UK Limited (80.66%)
 Minalex Limited (80.66%)
 Saguenay Shipping (UK) Limited
 (80.66%)
 Serco-Ryan Limited (80.66%)

Africa

Ghana
 Ghana Aluminium Products Limited
 (60%)
Guinea
 Compagnie des Bauxites de Guinée
 (13.77%)
Nigeria
 Alcan Aluminium of Nigeria Limited
 (58%)
 Alcan Aluminium Products Limited (60%)
South Africa
 Huletts Aluminium Limited (24%)

Asia

India
 Indian Aluminium Company
 Limited (55.27%)
Indonesia
 P.T. Alcan Indonesia (70%)
Japan
 Nippon Light Metal Company Ltd (50%)
 Toyo Aluminium K.K. (50%)
Malaysia
 Aluminium Company of Malaysia
 Berhad (38.62%)
 Johore Mining and Stevedoring Co.
 Ltd. (52.5%)
Thailand
 Alcan Thai Company Limited

South Pacific

Australia
 Alcan Australia Limited (70%)
 Alcan Queensland Pty Limited
 Queensland Alumina Limited (21.39%)
 Quintrax Marine Pty Limited (70%)
New Zealand
 Alcan New Zealand Limited (69.2%)
 Alcan Alloys Limited (69.2%)
 Alcan Anodisers Limited (69.2%)
 Alcan Building Products Limited (69.2%)
 Alcan Cory Metals Limited (34.6%)
 Aluminium Anodisers (N.Z.) Ltd (69.2%)
 Aluminium Conductors Limited (35.3%)
 Barker Aluminium Industries Limited (69.2%)
 Horizon Aluminium Products Ltd (69.2%)
 Rolls Gerard Tile Company Ltd (34.6%)
 Rolls Holdings Ltd (29.1%)

Other Companies

Holding and Financial
 Alcan Aluminium (UK) Limited, London
 Alcan Alumínio da América Latina, S.A.,
 Rio de Janeiro
 Alcan Europe N.V., Amsterdam
 Alcan Finances Overseas N.V., Amsterdam

International Sales

Alcan Canada Products Limited
 (Trading Division), Toronto, Canada
 Alcan Alumínio (America Latina) Inc.,
 Montreal - Latin America
 Alcan Asia Limited, Hong Kong - Hong Kong, Japan,
 India and other areas of Asia
 Alcan S.A., Zurich - Continental Europe
 (excluding Germany and Scandinavia),
 Near and Middle East, Africa, U.S.S.R.
 Alcan Metall GmbH, Frankfurt, Germany
 Alcan Lynemouth Limited, London, UK, Ireland,
 Scandinavia
 Alcan Ingot and Powders
 (Division of Alcan Aluminum Corporation),
 Cleveland, USA and Caribbean
 Alcan Project Services Limited (AES Division of
 Aluminum Company of Canada Ltd), Montreal -
 Engineering and feasibility studies, and
 project management related to the aluminium
 industry.
 Alcan Trading (Bermuda) Limited, Hamilton,
 Bermuda - Worldwide; trading in alumina-related
 products
 Alcan Trading Ltd., Montreal, Canada; trading in
 alum.-related products; logistics services.

Source: Alcan Aluminium Ltd., 1980.

* Division of Aluminum Company of Canada, Ltd.

REYNOLDS METALS CO.

Subsidiaries & Associated Companies

1. Consolidated Subsidiaries:

Aluminio Reynolds de Venezuela, S.A. (Alreyven) (Venezuela)
 Broad St. Road Corporation (Del.)
 Canadian Reynolds Metals Company, Limited - Societe Canadienne de Metaux
 Reynolds, Limitee (Quebec, Canada)
 Caribbean Steamship Company, S.A. (Panama)
 Reynolds Alumina Stade, Inc. (Del.)
 Reynolds Aluminium Deutschland, Inc. (Del.)
 Reynolds Aluminium Europe, S.A. (Belgium)
 Reynolds Aluminium Credit Corporation (Del.)
 Reynolds Aluminum Recycling Company (Mo.)
 Reynolds Cable Company Limited - La Societe des Cables Reynolds Limitee
 (Canada)
 Reynolds Extrusion Company Limited - La Compagnie de Profiles Reynolds
 Limitee (Canada)
 Reynolds Haitian Mines, Inc. (Del.)
 Reynolds International, Inc. (Panama)
 Reynolds Jamaica Alumina, Ltd. (Del.)
 Reynolds Jamaica Mines, Ltd. (Del.)
 Reynolds Metals European Capital Corp. (Del.)
 Tilo Company, Inc. (Del.)

2. Associated Companies:

Aluminio del Caroni, S.A. (Venezuela) (50%)
 Alumina Partners of Jamaica (Partnership) (Del.) (36 1/2 %)
 Aluminium Oxid Stade Gesellschaft mit beschränkter Haftung (W. Germany)
 (33 1/3 %)
 Industria Navarra del Aluminio, S.A. (Spain) (50%)
 Jamaica Alumina Security Company, Ltd. (Del.) (37%)
 La Compagnie Hydroelectrique Manicouagan - Manicouagan Power Company
 (Qué., Canada) (40%)
 Reynolds Aluminio, Sociedad Anonima (Mexico) (53%)
 Reynolds Aluminum Holland B.V. (Netherlands) (95%)
 Reynolds Aluminum Company of Canada, Ltd. - Societe d'Aluminium Reynolds
 (Canada) (65%)
 Reynolds Phillipine Corporation (Philippines) (39%)
 Robertshaw Controls Company (Del.) (27%)
 Societa Lavorazioni Industriali Metalli S.p.A. ("S.L.I.M.") (Italy) (60%)

* The names of a number of consolidated subsidiaries, unconsolidated subsidiaries and associated companies (20% to 50% owned) have been omitted because considered in the aggregate they would not constitute a significant subsidiary.

REYNOLDS METALS CO. - Main Activities By Geographic Location

<u>Aluminium Production and Processing</u>	<u>Building Products</u>	<u>Australia</u>
Bauxite	Ashville, Ohio	Bauxite and alumina (under construction)
Bauxite, Arkansas	<u>Cans</u>	Brazil
Lydford, Jamaica	Bristol, Virginia (ends)	Bauxite (2)
Miragoane, Haiti	Guayama, Puerto Rico (under construction)	Canada
<u>Chemicals</u>	Honolulu, Hawaii	Electric power generation, mill products, foil, packaging, building products
Hurricane Creek, Arkansas	Houston, Texas	Colombia
Calcined Coke	Kansas City, Missouri	Mill products, foil, utensils, ship-building
Baton Rouge, Louisiana	Rocklin, California (ends)	Egypt
<u>Alumina</u>	Salisbury, North Carolina	Mill products
Corpus Christi, Texas	San Francisco, California	Ghana
Hurricane Creek, Arkansas	Seattle, Washington	Primary aluminum
<u>Fluorspar</u>	Tampa, Florida	Italy
Eagle Pass, Texas	Torrance, California	Mill products, foil
<u>Shipping</u>	Wallkill, New York	Jamaica
Corpus Christi, Texas	Woodbridge, New Jersey	Alumina
<u>Power Generation</u>	<u>Can Machinery and Systems</u>	Japan
Corpus Christi, Texas	Chesterfield County, Virginia (2)	Mill products, foil, fabricated products
Hurricane Creek, Arkansas	Richmond, Virginia	Mexico
Jones Mills, Arkansas	<u>Research Facilities</u>	Mill products, foil
<u>Primary Aluminum</u>	<u>Alumina</u>	Philippines
* 1- Arkadelphia, Arkansas	Hurricane Creek, Arkansas	Mill products, foil, utensils
2- Baie Comeau, Québec	<u>Reduction</u>	Spain
3- Corpus Christi, Texas	Listerhill, Alabama	Mill products, foil, wire and cable
4- Jones Mills, Arkansas	<u>Metallurgical</u>	Thailand
5- Listerhill, Alabama	Richmond, Virginia	Mill products, foil
6- Longview, Washington	<u>Product Development</u>	The Netherlands
7- Massena, New York	Richmond, Virginia	Mill products, fabricated products
8- Troutdale, Oregon	<u>Electrical Technology</u>	Venezuela
<u>Recycling and Reclamation</u>	Bellwood, Virginia	Primary aluminum, mill products, foil, cans
Bellwood, Virginia (2)	<u>Packaging Technology</u>	West Germany
Listerhill, Alabama	Bellwood, Virginia	Alumina, primary aluminum, mill products
<u>Recycling Plants & Service Centers (85)</u>	Grottoes, Virginia	
<u>Electrical Products</u>	<u>Recycling Technology</u>	
La Malbaie, Quebec	Bellwood, Virginia	
Longview, Washington	<u>Other Minerals and Fuel Properties</u>	
Malvern, Arkansas	Coal: Kentucky, Wyoming	
<u>Mill Products</u>	Laterite & Clay: Oregon, Washington	
Bellwood, Virginia (2)	Georgia	
Bologna, Italy	Limestone: Kentucky, Arkansas	
Grand Rapids, Michigan	Fluorspar (mineral claims):	
Hamburn, West Germany	Colorado, Kentucky	
Listerhill, Alabama (2)	<u>Other Operations - Domestic</u>	
Louisville, Kentucky (2)	<u>Real Estate Projects</u>	
Maracay, Venezuela	Dover, New Jersey	
McCook, Illinois	East Syracuse, New York	
Merxheim, France	Fort Myers, Florida	
Mons-Ghlin, Belgium	Hartford, Connecticut	
Phoenix, Arizona (2)	Johnston, Rhode Island	
Richmond Hill, Ontario	Kittanning, Pennsylvania	
Torrance, California	New York Mills, New York	
<u>Continuous Rolling</u>	Philadelphia, Pennsylvania	
Hot Spring County, Arkansas	Pinellas Park, Florida	
<u>Finished Products and Other Sales</u>	Providence, Rhode Island	
<u>Packaging & Consumer Products</u>	South Glens Falls, New York	
Bellwood, Virginia	Syracuse, New York	
Grottoes, Virginia	Titusville, Pennsylvania	
Louisville, Kentucky	Phoenix, Arizona	
Mons-Ghlin, Belgium	Watertown, New York	
Richmond, Virginia (2)		
St. Louis, Missouri		

* Capacity & Technology	
	P = pre-bake, S = Söderberg
1-	62,000 25 P
	75 S
2-	159,000 100 S
3-	103,000 100 S
4-	113,000 100 P
5-	183,000 100 S
6-	191,000 100 S
7-	114,000 100 S
8-	118,000 100 P

TABLE 53

KAISER ALUMINUM & CHEMICAL CORP.

Subsidiaries and Affiliated Companies

1. Subsidiaries:

Kaiser Aluminum Europe, Inc.
 Kaiser Aluminium & Chemical of Canada Ltd. (Canada)
 Kaiser Aluminum & Chemical Sales, Inc.
 Kaiser Bauxite Company
 Kacor Australia Development Pty. Ltd.
 Kaiser Aluminum International
 Kaiser Aluminum (U.K.) Ltd.
 Kaiser Aluminum International (Japan) Corp.
 Nyffeler, Corti AG
 Phenix Aluminum S.A.
 FarBest Corp.

2. Affiliates (partially owned):

Comalco Ltd. (Australia) (45%)
 Hoover Comalco Industries, Inc.
 New Zealand Aluminium Smelters Ltd.
 Hindustan Aluminium Corporation Ltd. (India)
 Gerro Kaiser Dosenwerk GmbH & Co. KG
 Kaiser Aluminium Kabelwerk GmbH
 Kaiser - Preussag Aluminium GmbH & Co.

3. Joint Ventures:

Queensland Alumina Ltd. of Australia (QAL, 28.3%)
 Aluminium Bahrain (ALBA, 17%)
 Anglesey Aluminium Ltd. (66.7%)
 Volta Aluminum Co. Ltd. of Ghana (VALCO, 90%)
 Alumina Partners of Jamaica (36.5%)
 Kaiser Jamaica Bauxite Co. (49%)
 Gladstone Aluminum Ltd (Comalco Ltd - 30%) (Australia)

Source: Moody's Industrial Manual, 1980, p. 4868

Principal Subsidiaries & Affiliates

1. U.S.A.

Alusuisse of America, Inc./Holding Co./
Alusuisse Metals, Inc./Sales/
Consolidated Aluminum Corp. (60%)
Ormet Corp. (40%)
Heyward-Robinson Co., Inc./Engineering
& Consulting/
Maremont Corp.
Widmer & Ernst, Inc.

2. Switzerland

Kraftwerk Aegina AG/Power Station/(50%)
Alesa Alusuisse Engineering Ltd./
Engineering, Consulting/
Allega Ltd./Detail Sales/
Alusuisse Mining Ltd./Prospecting/
Alusuisse Real Estate Ltd./Real Estate/
Alusuisse Research Ltd./R & D/
Alusuisse Technologies & Services Ltd
Boxal Fribourg S A/Aluminum Cans/
Cheminvesta Chemical Investments Ltd/
/Holding Co./(5%)
Elektrizitätswerk Rheinau AG/Power
Station/(42%)
Energal Societe Anonyme
Energoproject-Alusuisse d'etudes et de
construction/Engineering/(50%)
Societe Immobiliere Feldegg SA/Real Estate/
Forces Motrices Valaisannes S.A./Power
Stations/(7%)
Gaznat S.A./Natural Gas Distribution/(7%)
Gazoduc S.A./Natural Gas Distribution/(15%)
Kraftwerke Cougra AG/Power Stations/(30%)
Intersomiga SA/Mining; Holding Co./(50%)
Ilsee-Turtmann-Aktiengesellschaft/Power
Stations/
Kernkraftwerk Kaiseraugst A.G./Nuclear
Power Station/(10%)
LMS Light Metal Systems Limited/Light
Metal Systems/
Lonza Ltd./Chemicals; Electricity/
Kraftwerk Loetschen AG/Power Station/
(50%)
Aluminium Ltd. Menziken/Semi-finished
products/(21%)
Metallica S.A./Sales/(20%)
Metallwerke Refonda AG, Secondary Smelter
de l'Industrie d'alumine de Tougue-
Dabola/ind. development studies/
Metoxit A.G./Oxide Ceramics/(50%)
Robert Victor Neher Ltd./Foil
Rhoneverke AG,/Power Stations/
Rheinkraftwerk Neuhausen AG/Power Stat./
(80%)
Societe Anonyme pour le Developpement
de l'Industrie d'Alumine de Tougue-
Dabola (50%)
Unifab A.G./Finished Products/
Widmer & Ernst A.G./General Contrac-
tors/

3. Other Countries

Salzburger Aluminium-Gesellschaft mbH/
Power Gen., Pr. Aluminum, Semi-Fin &
Finished Products, Sales/ (Austria)
S.A. Alusuisse Guy Geisler N.V./Sales/
(Belgium)
Alusuisse Denmark A.S./Sales/(Denmark)

Suomen Alusuisse/Sales/(Finland)
Alusuisse France S.A./Bauxite, Gallium,
Extrusions, Finished Products/
(France)
Societa Francaise de Recuperation
Metallurgique/Secondary Smelter/
(79%)(Fr.)
Aluminium-Walzwerke Singen GmbH/Semi-
Fin. & Fin. Pr., Foil/(98%)(W.Germany)
Alusuisse Deutschland GmbH/Co-ordina-
tion Sales/ (W.Germany)
Leichtmetall-Gess. mbH/Primary al.,
Semi-Finished Products/(98%)
(W. Germany)
Martinswerk GmbH/Alumina, Gallium/
(99%)(W.Germany)
Aluminium-Hütte Rheinfelden GmbH/
Electrodes, Power G., Pr.Al.Fin.
Pr./ (W.Germany)
Aluminium-Gießerei Villingen GmbH/
Foundry/(19%)(W.Germany)
Aluminium-Ind. Wohnbau/R.Estate/
(W.Germany)
Icelandic Al.Co./Pr.Al./(Iceland)
Centro Alluminio SpA/Coke Calcining,
Electrodes, Gallium/(Italy)
Elemes Societa per Azioni/prefabrica-
ted Elements, Finished Products/
(50%)(IT.)
Lavorazione Leghe Leggere (It.)/Semi.F.
Metalli in Polvere/Powder, Paste/
(50%)(It)
Societa Abruzzese di Navigazione per
Azioni/Sea Transport/(50%)(Italy)
Societa Alluminio Veneto per Azioni/
Power Generating, Primary Aluminum,
Semi-Finished Products, Foil/
(50%)(Italy)
Aluminium & Chemie Rotterdam BV/Elec-
trodes/(Netherlands)
Alusuisse Beheer BV/Holding Co./(NL.)
Aluminium Investments BV/Holding/(NL)
Alusuisse Nederland BV/Aluminum cans/
(Netherlands)
Alusuisse Norge A/S/Sales/(Norway)
Sor-Norge Aluminium A/S/Primary
Aluminum/(75%)(Norway)
Societade Portuguesa de Alumínio
Suico Limitada/Sales/(Portugal)
Alufluor Aktiebolag/aluminum Fluoride
Plant/(50%)(Sweden)
Alusuisse Svenska AB/Sales/(Sweden)
Alusuisse (UK) Ltd./Holding co./(U.K.)
Anglo-Swiss Aluminium Company Ltd./
Sales/(United Kingdom)
Swiss Aluminium Mining (UK) Ltd./Pros-
pecting/(United Kingdom)
Star Aluminium Company Ltd/Semi-Fini-
shed Products, Foil, Finished
Products/(U.K.)
Tvornica Laki Metalala 'Boris Kidric',
OOUR-ELEMES/Light Metal Structures/
(Yugoslavia)

Alusuisse has also subsidiaries in
Australia, Brazil, Cayman Islands,
Central African Rep., Costa Rica,
Gabon, Guinea, India, Iran, Japan,
Neth. Antilles, Nigeria, Sierra
Leone, South Africa and Venezuela.

TABLE 55

PECHINEY UGINE KUHLMANN (FRANCE)

Subsidiaries

1. Principal Subsidiaries:

Aluminium Pechiney, Cegedur Pechiney
 Scal, Cebal, Affimet
 Aluminium de Grece (Greece)
 Aluminio de Galicia (Spain)
 Alucam, Socatral (Cameroon)
 Ugine Aciers
 Produits Chimiques Ugine Kuhlmann
 Produits Chimiques et Industriels du Sud Est
 Lorilleux - Lefranc International
 Française d'Electrometallurgie, Metaux Speciaux
 Trefimetaux, Cuivre et Alliages
 Trafilerie e Laminatoi di Metalli
 Cefilac, Societe des Electrodes et Refractaires Savoie
 Ste Generale de Recherche et d'Exploitations Minieres
 Comurhex
 Pechiney Nederland (Netherlands)

2. U.S. Subsidiaries

Pechiney Ugine Kuhlmann Development (N.Y.)
 Ugine Kuhlmann of America (N.J.)
 Intsel Corp. (N.Y.)
 Howmet Aluminum Corp. (Conn.)
 Pechiney Ugine Kuhlmann Corp. (N.Y.)
 Howmet Turbine Components Corp. (Mi.)

Source: Moody's Industrial Manual, 1980, p. 5767

have noted that

Guyana, which nationalized the bauxite companies in 1974 and 1975, has apparently been unable to sell bauxite on the open market since 1974 for more than a few dollars over the cost of production (Woods & Burrows, 1980, p. 5).

The exports of the nationalized company Guyban actually decreased by 23 per cent from 1971 to 1974 (Auty, 1980). The main problem seems to be the existence of significant deposits of high-quality bauxite in countries not belonging to the IBA, which limits the effectiveness of the bauxite cartel.

Auty concludes that

the confrontation policy has made the Caribbean region unattractive to the multinationals in comparison with Australia, Brazil and Guinea. In effect, the Caribbean region has boosted short-term linkage gains through taxation at the expense of more substantial long-term gains offered by forward linkage (Auty, 1980, p. 178).

International Location Pattern

Despite all the criticism that has followed the classical theory of industrial location, we can still notice today that a few industries do have certain locational constraints which seriously limit their freedom in decision making. The aluminum industry is a typical example where the dependence on a few major locational factors of the type outlined in the classical model of A. Weber can be clearly identified.

Though the aluminum industry has been dominated by the six

MNCs, their spatial behaviour has been subject to several limitations.

Alcan of Canada has argued that cheap electricity is the main locational factor for the aluminum industry:

it is only natural that the prodigious amounts of energy called for in aluminum smelting should exercise a determining influence on the location of plants and the ultimate cost of the metal (Alcan Aluminium Limited, 1980, p. 13).

Indeed the growth of the Canadian aluminum industry supports this argument. The main advantage that Canada offers to the aluminum industry is relatively cheap energy. Most of the Canadian smelters use hydro-electric power and are located in close proximity to the hydro-power installations. The main producer of primary aluminum in Canada, Alcan has built its own hydro installations with total capacity of 3,583,000 kW. Six of them are located in Quebec and one in British Columbia, the Kemano hydro facilities which provide energy for the Kitimat smelter. The cheap energy sources compensate transportation costs of bauxites from the Caribbean and Africa. Canada does not represent a significant market for the aluminum industry, yet it remains one of the main producers of primary aluminum in the world. Its capacity is estimated at over 1,100 thousand mt per year and in 1978 it produced 1,048.5 th mt of aluminum (Tables 56 & 57). On the other hand the very location of Canadian smelters close to the large U.S. market might have had an important influence upon location of the industry.

The continuous expansion of the aluminum industry in the United States suggests that the major economic power in the world assures certain locational advantages for the industry. In 1978 the United States produced 4,358.1 th mt of primary aluminum. Since the energy costs in the U.S. tend

TABLE 56

ESTIMATES OF PRIMARY ALUMINUM PRODUCTION CAPACITY FOR THE YEARS 1972, TO 1975

Countries ('000 t.)	1972	1973	1974	1975
Germany	528	610	710	752
Benelux	180	180	180	(262)
France	432	432	432	432
Italy	188	313	313	353
E.E.C.	1,328	1,535	1,635	1,799
United Kingdom	243	304	365	365
Austria	93	112	143	149
Denmark	-	-	-	-
Finland	-	-	-	-
Iceland	50	70	70	70
Norway	697	711	812	822
Portugal	-	-	-	-
Sweden	85	85	85	85
Switzerland	95	95	95	95
E.F.T.A.	1,263	1,377	1,570	1,586
Spain	(151)	(151)	(171)	(191)
Greece	(145)	(145)	(145)	(145)
Ireland	-	-	-	-
Turkey	-	18	61	61
Total other Europe OECD	296	314	377	397
OECD Europe	2,887	3,226	3,582	3,782
United States	4,233	4,233	4,401	4,469
Canada	1,100	1,100	1,100	1,100
Japan	1,097	1,240	1,420	1,630
Australia	219	233	233	233
OECD Total	9,536	10,032	10,736	11,214
Yugoslavia	85	120	150	250
Bahrain	60	120	120	120
South Korea	23	23	23	30
India	190	225	267	267
Iran	-	23	45	45
Taiwan	38	38	38	80
Total Asia	311	429	493	542
South Africa	55	55	77	77
Cameroon	55	55	55	58
Ghana	147	147	147	147
Total Africa	257	257	279	282
Argentina	-	-	-	-
Brazil	92	112	112	122
Mexico	45	45	45	45
Surinam	66	66	66	66
Venezuela	23	23	45	45
Total Central and South America	226	246	268	278
New Zealand	75	113	113	113
Total World (excluding Eastern Countries)	10,490	11,197	12,039	12,679

Source: OCDE, 1973.

WORLD PRODUCTION OF ALUMINUM

Thousand Metric Tons

	1975	1976	1977	1978	1979	1980				
						Jan-Sept.	June	July	Aug	Sept
EUROPE										
Austria	89.1	88.7	91.8	91.3	92.7	70.5	7.6	8.1	7.8	7.9
France	382.6	385.1	398.8	391.4	395.1	323.4	35.0	36.4	36.3	35.1
Germany, Federal Republic	677.6	697.1	741.8	739.6	741.9	548.0	59.1	61.6	61.8	59.2
Greece	-136.0	134.0	129.7	143.9	140.8	108.8				
Iceland	61.8	65.2	70.8	73.8	72.1	56.7				
Italy	190.1	206.5	260.1	270.8	269.1	203.3				
Netherlands	257.6	248.9	236.9	259.2	255.6	198.1	22.0	21.2		
Norway	594.9	617.6	637.0	636.9	673.5	498.1	51.8	52.6	52.4	50.7
Spain	210.4	209.0	211.8	212.2	239.5	285.2				
Sweden	78.0	81.4	82.6	82.0	82.0	61.5				
Switzerland	79.0	73.2	79.8	79.5	83.0	64.5				
United Kingdom	308.3	334.5	349.7	346.2	359.5	278.9	29.0	32.6	31.8	28.6
Yugoslavia	166.3	182.6	176.5	176.0	174.0	126.5	13.9	14.8	14.9	14.2
Total	3,231.7	3,328.8	3,467.3	3,522.8	3,598.8	2,823.6	307.9	320.8	318.9	306.2
AFRICA										
Cameroon	51.9	48.7	46.2	41.3	44.5	38.8				
Egypt	2.0	59.0	90.0	100.4	101.2	67.6				
Ghana	143.3	151.1	154.1	113.5	168.7	147.0	16.1	16.5	16.2	16.0
South African Republic	75.9	78.4	78.0	81.1	86.3	65.6	7.2	7.3	7.4	7.4
Total	273.1	337.2	368.3	336.3	400.7	319.0	35.0	36.0	38.0	38.0
ASIA										
Bahrain	116.3	122.1	121.4	122.8	126.1	94.5				
Dubai	-	-	-	-	-	11.1	1.3	1.3	1.0	1.0
India	167.2	211.8	183.9	205.3	211.8	108.9	11.2	11.4	11.2	11.3
Iran	51.0	30.6	21.1	25.5	11.0	9.8				
Japan	1,013.3	919.4	1,188.2	1,057.7	1,010.4	834.7	92.3	95.5	94.6	89.4
South Korea	17.6	17.6	17.3	17.7	17.5	12.6	0.7	1.3	1.4	1.4
Taiwan	28.1	25.5	29.7	48.9	56.2	47.6	5.3	5.1	5.0	5.0
Turkey	16.5	35.5	51.3	33.0	32.1	20.6(2)				
Total	1,410.0	1,362.5	1,612.9	1,511.9	1,445.1	1,139.8	124.0	133.0	136.0	134.0
AMERICA										
Canada	878.1	631.0	973.5	1,048.5	860.3	804.3	89.0	90.8	91.1	85.6
U.S.A.	3,519.1	3,856.8	4,117.5	4,358.1	4,556.9	3,471.8	385.6	387.4	386.5	380.1
Argentina	24.1	41.1	49.9	49.4	118.4	78.0(1)	11.4	11.9	..	..
Brazil	121.4	139.2	167.1	186.4	238.1	195.4	21.6	22.3	22.1	21.4
Mexico	39.9	42.4	42.7	43.1	43.2	30.6				
Surinam	35.0	46.0	56.0	55.9	62.5	34.1(2)	3.1	3.6	5.5	..
Venezuela	49.7	46.5	43.4	71.1	207.0	207.0				
Total	4,667.3	4,805.0	5,450.1	5,813.5	6,086.4	4,821.2	542.0	546.0	548.0	538.0
AUSTRALASIA										
Australia	214.2	232.3	247.6	263.4	269.6	218.3	24.2	24.9	24.7	24.1
New Zealand	108.6	139.8	145.1	151.1	154.1	116.6	12.8	13.1	13.3	12.9
Total	322.8	372.1	392.7	414.5	423.7	334.9	37.0	38.0	38.0	37.0
TOTAL	9,904.9	10,205.6	11,201.3	11,599.0	11,974.7	9,438.5	1,044.9	1,073.8	1,078.9	1,053.2
Monthly Average	825.4	851.5	940.9	966.6	997.9	1,048.7				
OTHER COUNTRIES										
Czechoslovakia	43.3	40.0	36.5	36.8	35.0	26.3				
Germany D.R.	60.0	60.0	65.0	65.0	60.0	45.0				
Hungary	70.2	70.5	71.3	71.4	71.9	54.8	5.9	6.1	6.1	6.2
Poland	102.9	103.0	104.0	100.2	96.6	72.5				
Roumania	204.2	203.0	209.0	213.0	213.4	160.0				
U.S.S.R.	2,150.0	2,200.0	2,200.0	2,300.0	2,400.0	1,800.0				
China P.R. and Other Asia	300.0	320.0	350.0	360.0	370.0	277.5				
Total	2,930.6	2,996.5	3,035.8	3,146.4	3,246.9	2,436.1				
WORLD TOTAL	12,835.5	13,202.1	14,327.1	14,745.4	15,221.6	11,874.6				
Monthly Average	1,069.9	1,100.2	1,193.9	1,228.8	1,268.5	1,319.4				

This table shows production of primary aluminium. Some year totals are provisional.
 Note (1) January to July only (2) January to August only.

Source: World Metal Statistics, 1980, p. 13.

to be generally higher than in Canada, the U.S. case proves that the aluminum industry is also market-oriented and that the market attraction may outweigh other disadvantages. According to a UNIDO study

Owing to the need for abundant supplies of low-cost power and proximity to markets, the further treatment of alumina to produce aluminium metal can only rarely be undertaken on economic basis close to alumina production sites. While the need for power is obvious, the need for markets is even more relevant, owing to the difficulty of ensuring profitable sales in developed countries (UNIDO, 1969, p. 37).

Japan was the second largest producer of aluminum in the Western world and the Japanese example would seem to support the argument that the market attraction is the most important location factor in the aluminum industry. However further analysis of the Japanese industry shows that the large market cannot fully compensate other locational disadvantages. Japan's skyrocketting energy costs are prohibitive for the future expansion of the country's aluminum industry. Metals Week has noted that

on April 1, 1980 eight of Japan's nine regional electric power companies raised their rates an average of 51%,... it will push up smelting costs by more than 15¢ per lb, according to Yoshio Ogawa, president of the Japan's Aluminum Federation. Even worse, these increases do not take into account OPEC's yearend price hike, which will be felt by the power companies around midyear (MW, April 21, 1980, p. 4).

In 1980 the Japanese producers were in fact forced to close some of their less efficient smelters, which significantly reduced the country's production capacity estimated at 1,642,196 mt per year before the cutbacks. In the same year the industry was estimated to operate at 1,157,158 mtpy.

In Europe, Norway seems to offer the same locational advantages for the aluminum industry as Canada. These include cheap energy and proximity to the large Western European markets. In 1978 Norway produced 656.9 th mt of primary aluminum which was again below the industry's capacity (Tables 56 & 57). The main European producer, West Germany might be closer to the American example where the size of the market attracts basic industries.

The rapidly rising energy costs create the main obstacle for the further expansion of the aluminum industry in many advanced countries. Besides most industrialized countries do not have their own raw materials and they have to depend on imports. For example, the U.S. had to import over 80 per cent of bauxite for its industry:

in 1976 the United States was capable, with its alumina capacity, of supplying only 78 per cent of domestic smelter capacity. Dependence on bauxite imports is even more dramatic, the United States relies on outside sources for about 85 per cent of its bauxite consumption (excluding bauxite contained in imported alumina) (Woods & Burrows, 1980, p. 14).

The above two factors seem to favour new investments in certain developing countries which are able to offer the relatively cheap energy and their own bauxite (see U.S. Bureau of Mines, 1980). In Latin America Brazil and Venezuela have already become important producers of aluminum. The aluminum industry especially in Brazil is supported by the growing local market for primary aluminum and aluminum products. The expansion of the aluminum industry in Latin America has been supported by government policies which have provided import protection, as well as direct public participation on

several aluminum projects. Though Jamaica, Surinam, Guyana and Brazil remain the main exporters of bauxite in the region, some of them have also managed to create their own aluminum industries (Tables 58 & 59). Jamaica started production of alumina in 1954, Guayana in 1961 and Surinam in 1966 (UNIDO, 1969). In 1979 Brazil produced 238.1 thousand mt of primary aluminum, Venezuela 207 thousand mt, Argentina 118.4 thousand mt and Surinam another 62.5 thousand mt (Table 57).

New investments and the choice of particular locations by the MNC depend on the political stability in developing countries. Auty has argued that

stability in the terms of agreement is essential, given the large capital investments involved and the needs of the vertically integrated companies for security of supplies (Auty, 1980, p. 178).

TABLE 58

WORLD PRODUCTION OF BAUXITE
(thousand metric tons)

	1975	1976	1977	1978	1979	1979	1980	
					Jul-Sept.	Oct-Dec.	Jan-Mar.	
							Apr-June	
							July-Sept.	
EUROPE								
France	2,562.9	2,330.1	2,058.8	1,977.8	1,969.5	372.0	519.6	380.5
Greece	3,005.6	2,551.1	2,882.1	2,663.8	2,914.9	774.3	572.9	499.4
Italy	32.2	24.2	34.5	24.4	26.1	9.7	5.7	
Spain	8.5	13.5	9.6	10.0	8.2	2.1	2.1	2.1
Yugoslavia	2,306.0	2,033.0	2,044.0	2,566.0	3,012.0	856.0	533.0	821.0
Total	7,915.2	6,951.9	7,029.0	7,242.0	7,930.7	2,014.1	1,628.6	
AFRICA								
Guinea	8,406.0	11,316.0	10,871.0	11,648.0	12,199.0	3,050.0	3,049.0	3,050.0
Ghana	352.2	267.3	275.4	329.9	251.0	62.7	62.8	62.8
Mozambique	5.2	5.0	2.0					
Sierra Leone	716.0	660.0	745.0	716.0	680.0	170.0	170.0	170.0
Total	9,452.4	12,248.3	11,893.4	12,693.9	13,130.0	3,282.7	3,281.8	3,282.8
ASIA								
India	1,274.4	1,449.0	1,507.8	1,662.6	1,934.4	357.0	474.0	
Indonesia	992.6	940.3	1,301.4	1,007.7	1,093.0	260.1	315.4	309.0
Malaysia	703.6	660.2	616.2	615.1	386.5	107.5	97.0	
Turkey	558.2	463.0	567.1	449.1	157.4	35.4	23.3	
Total	3,528.8	3,512.5	3,992.5	3,734.5	3,571.3	760.0	909.7	
AMERICA								
Brazil	969.0	998.4	1,040.2	1,130.6	1,642.2	410.6	410.6	410.6
Dominican Republic	771.6	621.2	576.0	568.1	524.1	139.1	124.6	120.6
Guyana	3,829.0	3,108.0	3,344.0	3,479.0	3,354.0	838.5	838.5	838.5
Haiti	522.1	660.4	685.0	639.0	560.0	140.0	140.0	140.0
Jamaica	11,570.3	10,295.6	11,433.6	11,735.8	11,505.0	2,819.4	2,588.7	3,251.7
Suriname	4,749.0	4,585.0	4,951.0	5,113.0	4,769.0	1,145.0	1,056.9	1,241.8
U.S.A.	1,801.0	1,989.4	2,013.0	1,669.0	1,821.0	461.0	388.0	398.0
Total	24,212.0	22,258.0	24,042.8	24,334.5	24,175.3	5,953.6	5,936.5	6,401.2
AUSTRALIA								
	21,603.5	24,083.5	26,086.4	24,300.5	27,584.0	7,064.0	6,579.0	6,961.0
TOTAL	66,111.9	69,054.2	73,044.1	72,305.4	76,391.3	19,074.4	19,651.8	17,953.5
OTHER COUNTRIES								
Chiba P.R.	900.0	1,100.0	1,200.0	1,400.0	1,500.0	375.0	375.0	375.0
Hungary	2,889.5	2,917.8	2,949.2	2,898.8	2,975.8	758.0	755.0	732.0
Roumania	779.0	890.0	707.8	650.0	650.0	162.5	162.5	162.5
U.S.S.R.	6,600.0	6,700.0	6,700.0	6,700.0	6,500.0	1,625.0	1,625.0	1,625.0
Total	11,168.5	11,607.8	11,557.0	11,648.8	11,625.8	2,920.5	2,917.5	2,894.5
WORLD TOTAL	77,280.4	80,662.0	84,601.1	83,954.2	88,017.1	21,994.9	22,532.3	20,871.0

Production of bauxite is expressed in gross weight and does not therefore take account of variations in composition and moisture content.

Source: World Metal Statistics, 1980.

TABLE 59

WORLD PRODUCTION OF ALUMINA

	1975		1976		1977		1978		1979		1980		
	Total	of which for non-metallic uses	Total	of which for non-metallic uses	Total	of which for non-metallic uses	Total	of which for non-metallic uses	July-Sept.	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sept.
EUROPE (excluding Yugoslavia)													
Total	3,946.0	4,018.0	4,254.0	4,161.0	4,215.3	1,078.0	1,100.0	1,108.0	1,098.0	1,124.0	1,098.0	1,098.0	1,124.0
of which for non-metallic uses	611.0	666.0	694.0	691.0	766.0	194.0	207.0	200.0	230.0	186.0	230.0	230.0	186.0
AFRICA													
Guinea	639.0	562.0	562.0	622.0	622.0	178.0	170.0	175.0	180.0	175.0	180.0	180.0	175.0
ASIA													
India	337.0	467.0	555.0	555.0	568.0	138.0	136.0	167.0	134.0	125.0	134.0	134.0	125.0
Turkey	1,845.0	1,709.0	2,096.4	1,818.5	1,880.3	485.0	537.0	566.0	572.0	587.0	572.0	572.0	587.0
Japan	2,182.0	2,176.0	2,651.4	2,373.5	2,448.3	623.0	673.0	733.0	706.0	712.0	706.0	706.0	712.0
Taiwan	355.0	378.0	438.0	445.0	552.0	149.0	144.0	133.0	142.0	143.0	142.0	142.0	143.0
of which for non-metallic uses													
AMERICA													
Canada	6,253.0	6,405.0	7,166.0	7,220.0	7,273.7	1,720.0	1,975.0	2,012.0	1,976.0	2,041.0	1,976.0	1,976.0	2,041.0
U.S.A.													
Virgin Islands													
Brazil	3,966.0	3,283.0	3,881.0	4,004.0	4,002.0	989.0	1,095.0	1,094.0	1,184.0	1,148.0	1,184.0	1,184.0	1,148.0
Guyana													
Jamaica													
Surinam													
of which for non-metallic uses	10,219.0	9,688.0	11,047.0	11,224.0	11,275.7	2,709.0	3,070.0	3,106.0	3,160.0	3,189.0	3,160.0	3,160.0	3,189.0
	733.0	843.0	936.0	968.0	1,037.0	255.0	262.0	253.0	227.0	228.0	227.0	227.0	228.0
AUSTRALASIA													
Australia	5,107.0	6,219.0	6,673.0	6,764.0	7,414.6	1,904.0	1,894.0	1,837.0	1,841.0	1,661.0	1,841.0	1,841.0	1,661.0
New Zealand													
TOTAL	22,093.0	22,663.0	25,187.4	25,144.5	26,015.9	6,492.0	6,908.0	6,959.0	6,985.0	6,861.0	6,985.0	6,985.0	6,861.0
of which for non-metallic uses	1,699.0	1,887.0	2,068.0	2,104.0	2,335.0	598.0	613.0	586.0	599.0	557.0	599.0	599.0	557.0

Source: World Metal Statistics, 1980

Expansion Prospects for the Aluminum Industry

Not only physical properties of aluminum, new applications and markets for the metal, but also relatively low prices have contributed to the tremendous increase in demand for aluminum especially after World War II.

Brown & Butler have argued that

The very new metal aluminium has from the beginning had a strenuous fight to wrest business from age-old competitors such as iron and steel, copper, brass, lead, etc. This fight could obviously not have been successful if the price of aluminium had not been sufficiently low to have encouraged substitution on an economic basis (Brown & Butler, 1968, p. 147).

The upward trends in aluminum consumption and production will most likely continue in future. Scotiabank has reported that

Aluminum, of all the major non-ferrous metals, emerged the most unscathed from the period of worldwide recession in 1974-75 when demand for metals plummeted and producers accumulated heavy stocks (Scotiabank, 1980, p. 2).

Consumption of Aluminum

There are four principal sectors which use close to 67 per cent of total aluminum consumed in Western Europe and 75 per cent of aluminum consumed in the United States. These are building and construction, transportation, packaging and electrical engineering (Altenpohl, 1980, see also Huggins, 1965; Savey, 1977, Hainline, 1979).

a. building and construction

This sector accounts for 26 per cent of total aluminum consumption in the Western World. The significant increases in aluminum demand are expected to produce door and window frames, roofing and siding, various architectural elements, wall panels and facades, such as 'Alucopan' and 'Alucobond' pannels, which are made of styropor materials and polyethylene pressed between two aluminum sheets; curtain walls, gutters, solar collectors, heat exchangers and various elements of mobile-homes.

b. transportation

The main consumers of aluminum within the transportation sector, which uses 22 per cent of aluminum consumed in the Western countries, are industries connected with rail & road transportation, though air transportation becomes also more and more important. It is estimated that in commercial vehicles a lb of weight saved increases the carrying capacity by a lb. For example aluminum profiles are used for the subway in Brussels and they are estimated to contribute to saving of approximately 18,000 kWh per subway-car per year. The additional energy costs required for the production of aluminum are paid back in 1.6 years (Altenpohl, 1980).

In the automobile industry the increased use of aluminum replaces steel. There are more than 100 separate applications, ranging from hoods, transmission housings, pistons and engine blocks to radiators and fan spacers. The Aluminum Association has predicted that by 1985 usage of aluminum by the car manufacturers will double over the current levels to

approximately 118 pounds per passenger car (Hainline, 1979). For instance the new Ford LTD weighs about 800 pounds less this year compared to the previous model and the Company will continue to increase aluminum content in new models

Ford Motor Co. expects to use 22 per cent more aluminum in its 1985 model year cars than in its current models. The company predicts that its 1985 autos will carry 50 lb of wrought aluminum and 106 lb of cast aluminum, compared with 38 lb and 90 lb scheduled for its 1981 models (MW, June 16, 1980, p. 5).

Aluminum extrusions and sheets are also increasingly used for bodies of commercial and rail vehicles.

c. packaging

Packaging consumes close to 13 per cent of all aluminum in the same group of countries. The most important factors that promote aluminum use in packaging are good protection against many chemical agents, vapour and water as well as against light and ultraviolet rays that aluminum assures. According to Reynolds' projections the demand for aluminum in the packaging industry could grow by almost 30 per cent between 1980 and 1986. (Table 60).

Aluminum is used in the packaging industry to produce beverage cans and containers, caps, thin strip and foil. It is estimated that one ton of aluminum produces 32,000 beverage cans, while one ton of steel produces only 15,000 cans. Besides aluminum cans can be easily recycled at very low costs. The use of foil is especially well spread in food packaging, pharmaceuticals and tobacco products. Aluminum is also applied in combination with other materials, such as paper and plastics.

TABLE 60

ALUMINUM IN PACKAGING (in Tons)

	1980	1981	1986	Annual Growth Rate 1981-1986
Flexible packaging	94,500	101,000	125,500	4.3%
Semi-rigid containers	80,000	84,500	91,000	1.2%
Household foil	117,500	117,500	126,500	1.4%
Foodservice foil	24,000	25,000	30,500	3.7%
Caps & closures	30,500	31,500	33,000	0.3%
Metal cans (beverage & non- beverage)	1,286,500	1,418,000	1,694,000	3.4%
Composite cans	14,000	15,000	22,500	8.3%
Other packaging	9,500	14,500	19,500	5.2%
Total	1,656,500	1,807,000	2,142,500	3.3%

Source: MW, March 23, 1981, p. 6

(Estimate by Reynolds Metals)

d. electrical engineering

This sector accounts for 12 per cent of total aluminum consumption in the Western World. The main demand comes from electrical and telecommunication industries. Aluminum is used for electrical conductors, often replacing copper; high voltage power transmission lines in the form of ACSR (aluminum conductor steel reinforced) and insulated or covered wire and cable.

On a country to country basis the world's largest consumers of aluminum in 1979 were the United States which accounted for almost 40 per cent of the Western World's consumption of 12.6 million tons of primary aluminum, Japan with 1,802 thousand tons and 14% share; West Germany - 1,068 thousand mt and 8%; France - 596 thousand mt and 4.7%; Italy - 448 th mt and 3.6%; the United Kingdom - 418 th mt and 3.3% and Canada - 349 th mt and 2.7% (Tables 61 & 62). The building and construction sector is the main consumer of aluminum in the United States and Japan, while in Western Europe it is the transportation sector (Table 63).

There seems to be a significant correlation between the level of development and aluminum consumption per capita, with the highest rates in advanced countries. According to Alcan sources the United States consumption per capita was close to 30 kg, West Germany - 19 kg, Japan - 18 kg, Spain - 7 kg and Brazil - 2.6 kg (Alcan, 1980, see also Savey, 1977).

Almost all major consumers of aluminum, except Canada and Norway, are unable to satisfy their internal demand and they have to rely on imports from other countries. Japan, the United States and West Germany are the main importers of aluminum, while Canada and Norway lead in exports.

TABLE 61

ESTIMATES OF PRIMARY ALUMINUM CONSUMPTION FOR THE YEARS 1972 TO 1975

Countries	1972	1973	1974	1975
Germany (1)	710	790	860	920
Benelux	263	276	291	306
France	(395)	(430)	(480)	(510)
Italy	270	300	325	350
E.E.C.	1,638	1,796	1,956	2,086
United Kingdom	395	418	447	462
Austria	(78)	(84)	(91)	(99)
Denmark	(10)	(11)	(12)	(13)
Finland	(17)	(18)	(19)	(20)
Iceland	1	1	1	1
Norway	80	91	103	112
Portugal				
Sweden	80	88	100	106
Switzerland	98	104	110	116
E.F.T.A.	759	815	883	929
Spain	(161)	(174)	(188)	(203)
Greece	(21)	(23)	(25)	(27)
Ireland				
Turkey	(30)	(32)	(35)	(38)
Total others	212	229	248	268
OECD EUROPE	2,609	2,840	3,087	3,283
United States	4,268	4,567	4,887	5,229
Canada	264	282	300	318
Japan	1,110	1,280	1,470	1,690
Australia	(132)	(145)	(159)	(174)
	(140)	(154)	(171)	(191)
OECD Total	8,386	9,119	9,909	10,703
Yugoslavia	100	115	145	160
Asia (excluding Japan)	322	367	423	488
Africa	107	125	146	171
Central and South America	195	205	220	235
New Zealand	23	24	26	28
Total World (excluding Eastern Countries)	9,133	9,955	10,869	11,785

(1) including primary aluminum alloys

Source: OCDE, 1973.

TABLE 62

WORLD CONSUMPTION OF ALUMINIUM (thousand metric tons)

	1975	1976	1977	1978	1979	1979		1980	
						July-Sept.	Oct.-Dec.	Jan.-Mar.	Apr.-June
EUROPE									
Austria	83.7	106.6	99.9	107.9	113.1	25.7	28.1	30.8	30.2
Belgium	178.2	244.2	235.3	256.6	242.0	49.8	60.3	60.0	69.0
Denmark	5.0	6.2	6.0	7.3	11.1	3.3	2.0	4.8	2.9
Finland	18.8	23.2	28.9	25.0	27.0	5.9	5.2	4.3	9.6
France	399.2	492.6	533.8	532.7	595.9	130.0	166.8	168.8	166.1
Germany, Fed. Rep.	703.7	954.4	912.3	952.3	1,067.8	275.9	262.7	259.7	290.9
Greece	39.2	51.0	56.7	68.0	76.5	16.7	19.2	19.0	19.1
Italy	270.0	365.0	382.0	404.0	448.0	91.0	135.0	112.0	113.0
Netherlands	77.0	105.8	101.9	94.7	104.1	23.4	25.5	25.3	26.0
Norway	92.7	93.1	96.1	106.2	135.6	26.0	26.0	24.4	24.4
Spain	216.8	222.5	250.8	235.6	234.8	61.4	77.4	60.0	59.0
Sweden	114.1	101.5	92.8	98.0	103.3	23.4	26.0	25.8	25.8
Switzerland	84.4	104.6	109.8	105.0	111.3	28.0	29.2	29.6	30.1
United Kingdom	392.7	444.5	418.1	402.2	417.6	84.3	100.4	114.6	124.0
Yugoslavia	127.7	135.5	153.9	158.8	170.3	57.6	30.0	47.1	40.6
Other Europe	7.3	15.2	15.6	23.8	24.5	5.0	5.0	6.1	6.1
Total	2,810.5	3,465.9	3,493.9	3,578.1	3,882.9	907.4	998.8	992.3	1,036.8
AFRICA									
Cameroon	26.2	27.6	23.2	30.0	24.6	6.2	6.2	6.2	6.2
South Africa	52.2	46.8	52.5	51.0	55.0	15.6	12.9	16.0	22.5
Egypt	15.0	20.0	30.0	32.0	35.0	8.8	8.6	8.8	8.8
Ghana	5.8	6.0	6.0	6.0	6.0	1.5	1.5	1.5	1.5
Other Africa	11.4	13.6	13.7	21.9	9.8	2.5	2.5	2.5	2.5
Total	110.6	114.0	125.4	140.9	130.4	34.6	31.7	35.0	41.5
ASIA									
India	145.0	170.0	187.6	224.0	224.0	63.3	45.1	56.0	56.0
Japan	1,170.8	1,609.6	1,419.9	1,656.1	1,802.0	413.3	459.4	465.4	478.6
S. Korea	36.1	50.4	79.5	103.2	93.9	23.5	23.5	23.5	23.5
Taiwan	45.7	55.6	68.3	99.0	127.1	25.1	26.0	25.5	24.3
Turkey	60.1	68.1	78.0	45.0	24.3	6.1	6.1	6.0	6.0
Other Asia	134.2	130.3	189.2	185.5	173.2	43.3	43.3	43.3	43.3
Total	1,591.9	2,084.0	2,022.5	2,312.8	2,444.5	574.6	603.4	619.7	631.7
AMERICA									
Canada	293.1	322.2	332.4	338.8	349.0	87.3	87.3	87.5	87.3
U.S.A.	3,265.0	4,490.5	4,756.0	4,978.1	5,008.7	1,280.0	1,230.0	1,294.1	1,191.6
Argentina	72.6	67.4	62.0	60.5	73.5	18.4	18.4	14.0	16.7
Brazil	209.2	215.5	229.5	234.5	289.9	72.4	72.4	68.2	77.5
Mexico	50.9	55.5	52.9	82.5	99.3	24.8	24.8	24.0	24.0
Venezuela	38.4	44.5	52.0	45.0	60.6	15.0	15.9	15.0	15.0
Other America	31.1	27.3	36.0	31.6	35.9	9.0	9.0	9.0	9.0
Total	3,960.5	5,222.9	5,520.8	5,771.0	5,916.9	1,506.9	1,457.8	1,511.8	1,421.1
AUSTRALASIA									
Australia	133.2	158.8	170.1	183.8	215.2	49.5	52.6	63.3	67.7
New Zealand	20.1	27.7	23.3	22.1	25.1	6.2	6.3	6.3	6.3
Total	153.3	186.5	193.4	205.9	240.3	55.7	58.9	69.6	74.0
TOTAL	8,626.8	11,073.3	11,356.0	12,008.70	12,615.0	3,079.2	3,150.6	3,228.4	3,205.1
Monthly average	718.9	922.8	946.3	1,000.7	1,051.3	1,026.4	1,050.2	1,076.1	1,068.4
OTHER COUNTRIES									
Cuba	1.0	1.0	1.0	1.0	1.2	0.3	0.3	0.3	0.3
Czechoslovakia*	140.0	124.0	125.0	131.8	130.0	32.5	32.5	32.5	32.5
Germany, Democratic Republic*	200.0	210.0	215.0	225.0	230.0	57.5	57.5	57.5	57.5
Hungary	166.0	170.4	168.7	175.8	165.5	41.4	41.4	41.4	41.4
Poland	138.0	145.0	149.0	160.0	170.0	42.5	42.5	42.5	42.5
U.S.S.R.*	1,580.0	1,690.0	1,760.0	1,830.0	1,865.0	466.3	466.3	466.0	466.3
Roumania	120.0	130.0	150.0	150.0	145.0	36.2	36.2	36.0	36.3
Bulgaria	38.0	40.0	45.0	47.0	48.0	12.0	12.0	12.0	12.0
China*	320.0	470.0	510.0	560.0	580.0	145.0	145.0	145.0	145.0
Other Asia*	20.0	22.0	31.2	36.5	38.1	9.5	9.5	9.5	9.5
Total	2,723.0	3,002.4	3,154.9	3,317.1	3,372.8	843.2	843.2	842.7	843.3
WORLD TOTAL	11,349.8	14,075.7	14,510.9	15,325.8	15,987.8	3,922.4	3,993.8	4,071.1	4,048.4
Monthly average	945.8	1,173.0	1,209.2	1,272.2	1,332.3	1,307.5	1,331.3	1,357.0	1,349.5

This table shows consumption of primary aluminum.
Source: World Metal Statistics, 1980.

TABLE 63

CONSUMPTION OF ALUMINUM IN MAJOR APPLICATION
SECTORS AS PERCENT OF TOTAL ALUMINUM CONSUMPTION
(during 1974)

	Building & Construction	Transportation	Containers & Packaging	Electrical Engineering
USA	25	19	18	14
W. Germany	18	21	11	9
France	11	31	10	16
Italy	23	28	11	7
UK	11	27	10	14
Japan	33	20	2	12
Brazil	23	20	8	21
Australia	34	15	19	13

Source: Altenpohl, 1980, p. 471

In 1979 Japan imported 748 thousand metric tons of aluminum, the U.S. 517 thousand mt and West Germany 511.4 thousand mt (Table 64). The Japanese Ministry of International Trade and Industry has predicted that

by 1985 Japanese demand for aluminum would be 2.3 - million mtpy, domestic primary production would be 1.4 - million mtpy, and imports would be 1.25 - million mtpy (MW, April 21, 1980, p. 4).

The growing dependence on imports of aluminum and the cutback program in 1980 support the argument that Japan is unable to provide locational advantages for aluminum producers and may fail to attract new investments. If the energy costs continue to escalate in the future, Japan, as well as some Western European countries including West Germany, France and Italy, will not be able to compete with cheap aluminum imports from other countries which have a comparative advantage in the aluminum production. The world trade in primary aluminum and aluminum products is subject to national and international protectionist policies. In developed countries tariffs on imports of primary aluminum are less than 10 per cent of its value (see Table 65). Most developing countries have substantially higher tariffs and other restrictions on imports of aluminum and especially aluminum products which is a part of their import substitution policies.

It has been estimated that the world consumption of aluminum in 1980s will grow at annual rates of 4 to 5%, as opposed to 9% during the period 1960-1974 (Alcan, 1980 and Scotiabank, 1980). Altenpohl has argued that the growth of 4 to 5% per annum

could lead to a shortage of primary aluminum in the early 1980s of approximately 1 million tons. This could be an opportunity to expand production capacities of primary aluminum, and further get

WORLD TRADE IN UNWROUGHT ALUMINIUM

Thousand metric tons

	1975	1976	1977	1978	1979	1980			
						Jan-June	June	July	Aug
IMPORTS									
Austria	18.0	21.0	19.2	14.9	30.7	18.9	..	..	..
Belgium	188.2	258.2	238.4	266.8	252.8	138.6	26.0	..	..
Denmark	5.0	10.9	13.0	17.1	21.1	11.3	1.6	1.4	1.8
Finland	19.2	24.5	28.5	21.7	24.9	11.2	2.3	3.5	2.1
France	217.9	231.4	275.3	291.1	315.3	194.3	34.0	31.5	13.1
Germany, F.R.	287.4	417.2	440.4	434.0	511.4	304.4	62.1	63.6	45.6
Greece	0.9	3.6	4.5	0.4	0.4	..	..	23.1	..
Irish Republic	5.3	7.7	5.6	6.3	7.9	3.1	0.3	0.4	0.2
Italy	111.1	196.5	195.5	190.5	236.6	127.0	20.9	31.2	20.8
Netherlands	121.4	162.1	162.3	145.5	167.3	120.8	19.6	23.1	12.8
Norway	19.4	23.6	8.5	8.0	8.9	6.4	1.5	0.4	1.7
Portugal	4.8	9.0	..	..	..	..	..	..	..
Spain	28.6	14.4	36.8	38.0	7.1	1.5	..	..	..
Sweden	43.8	46.7	43.4	34.2	36.7	19.3	3.0	1.2	..
Switzerland	16.1	31.1	39.2	35.3	41.2	27.4	3.5	5.5	4.7
United Kingdom	159.6	217.9	197.4	185.0	182.1	100.9	17.4	12.4	13.6
Yugoslavia	35.5	38.4	47.4	44.2	44.4	26.8	1.0	7.2	3.6
S. Africa	1.6	0.7	0.5	0.5	0.5	..	..	..	..
Hong Kong	19.9	21.1	25.9	28.5	28.8 ⁽³⁾
India	6.6	1.1	5.1	20.3	15.5	37.7 ⁽⁵⁾
Iran	..	2.8	13.0	0.2	..	..	..	..	..
Japan	378.3	430.1	533.8	740.2	748.4	439.4	74.0	76.6	76.7
S. Korea	16.5	32.4	63.4	86.5	82.8	31.3	4.9	14.4	..
Taiwan	11.6	36.4	52.5	48.7	52.9	22.8	4.5	4.5	5.4
Argentina	23.1	21.5	..	..	..	..	..	..	..
Brazil	63.8	78.7	82.8	60.4	51.8	..	..	..	..
Canada	18.2	22.5	20.8	11.5	24.0	5.5	1.3	0.6	0.5
Mexico	9.4	15.6	8.4	..	32.8	..	..	..	..
U.S.A.	413.4	516.8	610.5	686.2	517.4	226.5	46.9	..	..
Venezuela	0.1	2.2	32.0	39.9	..	..	..	..	..
Australia	0.4	0.5	0.2	0.3	3.4	1.8	0.7	1.5	0.6
TOTAL	2,247.1 ⁽¹⁾	2,916.6 ⁽¹⁾	3,204.3 ⁽¹⁾	3,489.0 ⁽¹⁾	3,470.4 ⁽¹⁾	1,876.9 ⁽¹⁾
EXPORTS									
Austria	8.5	8.6	8.7	11.7	10.3	4.5	..	..	..
Belgium	10.0	14.2	13.1	10.2	10.8	9.6	1.3	..	..
Denmark	4.7	4.7	7.0	9.9	10.0	3.6	0.7	0.2	0.5
Finland	0.5	1.2	3.2	2.7	1.3	1.6	0.2	0.3	0.1
France	163.8	149.2	165.8	166.4	157.6	81.5	14.2	12.7	12.3
Germany, F.R.	159.7	281.4	199.1	271.6	247.9	115.1	19.4	22.5	14.5
Greece	89.1	88.9	77.5	85.3	73.8	..	..	..	..
Iceland	43.6	78.6	74.2	77.3	76.2	33.4	..	..	..
Italy	33.3	9.4	24.2	69.3	22.4	5.9	0.8	1.0	0.8
Netherlands	264.2	290.4	316.2	294.4	359.4	194.1	27.0	36.9	23.0
Norway	451.5	561.8	555.3	630.1	565.3	288.8	48.2	48.0	42.0
Spain	2.4	10.8	8.9	5.8	42.9	27.0	..	..	..
Sweden	8.0	13.3	32.5	38.5	19.6	7.7	2.0	1.3	..
Switzerland ⁽²⁾	22.7	33.2	29.0	32.9	47.4	24.7	4.5	3.4	2.9
United Kingdom	87.7	162.1	144.8	159.9	204.7	87.8	13.2	11.9	14.0
Yugoslavia	74.1	85.6	70.1	61.4	48.1	21.7	5.1	4.2	4.5
Cameroon	23.5	21.1	23.9	11.6	20.5	..	..	..	..
Ghana	135.8	145.1	148.1	111.3	152.6	..	..	..	..
South Africa	13.7	20.4	28.3	37.4	29.4	9.9	0.6	0.5	0.6
Bahrain	85.7	125.7	118.3	140.1	130.8	..	..	..	..
India	..	34.8	5.3	2.9	0.3	..	..	..	..
Iran	17.5	10.5	..	0.2	..	..	..	..	..
Japan	83.5	69.7	99.4	54.6	7.9	3.3	0.5	0.5	2.5
Taiwan	1.5	0.3	0.1	0.4	..	..	..	..	..
Canada	509.2	507.5	655.3	862.6	550.5	371.7	71.1	82.1	72.8
U.S.A.	168.7	138.6	88.9	102.4	164.0	251.1	30.6	..	..
Surinam	26.4	46.5	57.7	56.9	62.5	25.0	3.1	3.6	5.5
Venezuela	10.4	11.3	6.3	17.0	146.4	..	..	..	..
Australia	76.7	64.5	77.7	80.0	76.0	15.4 ⁽⁴⁾	1.5	6.9	5.5
New Zealand	91.1	108.1	121.8	132.8	129.1	20.0	..	..	..
U.S.S.R.	502.4	..	..	..	..	..	..	..	..
TOTAL	3,169.9 ⁽¹⁾	3,097.5 ⁽¹⁾	3,161.0 ⁽¹⁾	3,537.6 ⁽¹⁾	3,367.7 ⁽¹⁾	1,603.4 ⁽¹⁾

This table shows principal imports and exports of aluminium and aluminium alloys. More detailed information including countries of origin of imports and destination of exports may be found for the major countries in the appropriate country tables. (World Metal Statistics, 1980).

Notes (1) Totals shown represent information available at time of going to press. (2) Includes scrap but excludes alloys. (3) January to November (4) January to February. (5) January to May.

Source: World Metal Statistics, 1980.

TARIFFS AND DUTIES ON ALUMINUM AND RELATED PRODUCTS IN THE U.S. AND E.E.C.

Duties on Aluminum and Related Products in the U.S. (1976) (per pound)

1.	Bauxite, crude	none
2.	Bauxite, refined	none
3.	Alumina	none
4.	Aluminum and aluminum alloys in unwrought form	\$ 0.01
5.	Aluminum scrap	none
6.	Aluminum plates, sheets, bars, rods, wires and squares	\$ 0.02
7.	Aluminum silicon	\$ 0.01

Tariffs of European Economic Community (EEC) (ad valorem)

1.	Alumina	5.5 %
2.	Unwrought aluminum	7 %
3.	Semifabricated products	12 %
4.	Powders and flakes	10.5 %

Source: Woods & Burrows, 1980, p. 18.

more involved in forward integration (Altenpohl, 1980, p. 487).

Other industry observers do not share Altenpohl's optimism. The new study by Anthony Bird Associates warns that the aluminum industry may have 'severe oversupply problems in late 1980s':

the fundamental problem is that while capacity will grow by 7.4% in the years after 1983, consumption will be growing only in line with non-socialist world industrial production, or less than 4% per year with the result that the industry's capacity utilization rate could be forced down to 78% by 1988 (MW, March 16, 1981, p. 3).

In fact, 1980 was not a promising year for the industry with rather slack demand and falling prices from 82.5 - 84¢ per lb in April to 70 - 71¢ in late November (MW, April 28, 1980 & MW, Nov. 24, 1980), though long term trends in prices were more favourable for the aluminum producers (Table 48 and Figure 8).

Development of New Technologies

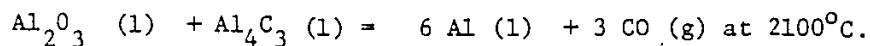
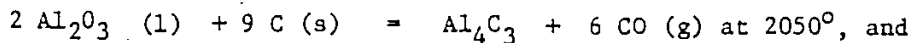
New processes for aluminum smelting that have been developed over the years can be classified into three main groups:

1. thermal reduction processes;
2. subhalide disproportionation processes; and
3. non-classical electrolysis processes (Grjotheim, Krohn, Malinovsky, Matiasovsky and Thonstad, 1977 and Grjotheim & Welch, 1980).

(1) Within the first group one can further distinguish:

a. carbothermal process

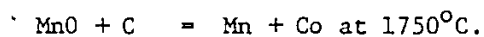
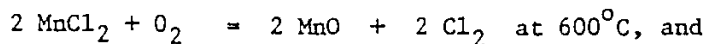
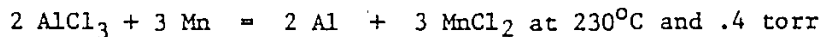
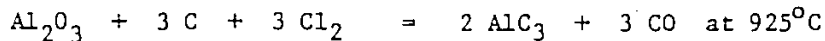
This reduction process allows the use of other aluminous ores and clays, such as kaolin and pyrophyllite. Two MNCs have seemed to make significant progress in developing carbothermal reduction processes. Alcoa has patented two carbothermic processes and Pechiney has proposed H + process. Cochran's process of Alcoa is based on two reactions



In Pechiney's process alumina is first produced from aluminous ores, then Al_4C_3 is obtained when alumina is reduced by carbon at high temperatures of 2200°C . The final stage decomposes carbide to aluminum and carbon at 2000°C .

b. Toth Process, which is an indirect carbothermal reduction of alumina.

The Toth process may use several raw materials with low content of aluminum oxide. The basic reactions lead to reduction of AlCl_3 by Mn and can be described as follows

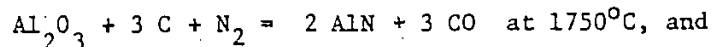


Though this process reduces the consumption of energy, it increases

significantly required carbon inputs.

c. nitride processes

Aluminum nitride is first obtained through the reaction



then it is decomposed to Al and N₂ at high temperatures.

Similarly to the other two carbothermal reduction processes, the main problem remains with unneeded by-products. There are still several technological problems which have to be solved for the processes to be used commercially.

(2) Subhalide disproportionation processes have been tested among others by Alcan Aluminium Ltd. Alcan has developed a subchloride method which involves five stages and which includes the formation of AlCl₃ through the reaction between an alloy, which contains Al, and chlorine and recovery of aluminum through decomposition of the AlCl.

Also Aluminium - Industrie - AG has experimented with subhalide processes and confirmed their possible utilization in industrial production.

(3) The greatest attention in the third group which has been classified as non-classical electrolysis processes, is usually given to the Alcoa Chloride Process completed in 1973. This new method is believed to reduce the energy requirements by approximately 30 per cent and assures lower levels of pollution. The Alcoa's process is based on three steps:

a. alumina stage to produce alumina;

b. chlorination stage, where alumina with added carbon is chlorinated at
700 - 900°C;

c. electrolysis of the molten aluminum chloride in a specially designed Alcoa's cell at approximately 700°C (Figure 9 & 10 - Appendix III).

The total reaction can be described as



The energy consumption is estimated at 9 kWh per 1 kg of aluminum which indeed reflects a very significant reduction from previous levels, though the chlorination step is not included in that calculation as it is kept secret by the Company. Alcoa has already put this new process into industrial use in its new smelter in Palestine, Texas in 1976. The smelter has a capacity of 15,000 tons py.

Despite the large investments in R & D by all MNCs, most inventions in aluminum processing have not been turned into commercial innovations. As a result the major producers of aluminum have continued to depend on more 'traditional' methods which have undergone several modernizations.

Alcoa has only one smelter that uses 'Söderberg' anodes, while all other plants have pre-bake facilities. Reynolds has both 'Söderberg' and pre-bake smelters, though a tendency towards pre-bake technology could be noticed in more recent expansions. On the other hand all six Canadian smelters operated by Alcan are 'Söderberg' (U.S. Bureau of Mines, 1980).

The monopolization of aluminum technology by the six giants is also questionable. Metals Week has noted that

Alcoa, the acknowledged leader in aluminum smelting technology, has recently gone abroad for technology to modernize one of its

own smelters. The company has signed a contract with Sumitomo Aluminum (Japan) to buy technology that reduces pollution and energy consumption in Söderberg smelters... Alcoa is not the first North American producer to buy the Sumitomo know-how to modernize inefficient Söderberg plants. Anaconda converted its Columbia Falls, Mont., smelter to it, Martin Marietta is installing it at its two smelters in Oregon and Washington, and Alcan is evaluating it at its Kitimat, B.C., smelter (MW, Sept. 1, 1980).

Cooperation over technology between aluminum producers becomes more frequent. Alcan has recently bought Alcoa's pre-bake technology for its new smelter in Quebec and seriously considers further modernization of its existing plants with the help from other producers. The U.S. government assistance has encouraged Alcoa to enter into cooperation with the U.S. Energy Department to develop a new energy-saving anode that could reduce consumption of petroleum coke by the aluminum smelters.

Planning Venezuelan Aluminum Industry

Similarly to several other developing countries, the growth of the aluminum industry in Venezuela has been supported by the government's policies and public financing. Aluminum was an essential part of the country's industrial strategy.

Comparative Advantage

The choice of aluminum industry over other sectors was not accidental. The most popular argument in favour of the new investment was that of comparative advantage that the country and especially the Guayana region seemed to offer. Yet, the existence of comparative advantage in Venezuela was questionable.

First, aluminum smelting is a highly capital-intensive sector. The capital intensity in the Venezuelan non-ferrous metals industries was much higher than the national average (Table 66), while the gross production values and the value added per fixed capital were significantly below the national level, suggesting lower rentability of this sector (Tables 67 & 68).

The choice of another capital-intensive industry could be explained by low official levels of unemployment, especially in Guayana, and the relative abundance of capital. It was possible that Venezuela as well as several other developing countries no longer had comparative advantage in labor intensive industries.

TABLE 66

FIXED CAPITAL PER EMPLOYEE (in Bolivars)

SECTORS	1971	1977
Traditional Industries	18,802	29,188
Food	24,110	38,206
Beverages	31,800	72,373
Tobacco	19,635	40,144
Textiles	22,968	40,063
Clothing	7,216	8,853
Leather & Leather Products	15,361	14,201
Footwear	5,760	10,769
Wood Products	12,749	26,264
Furniture	6,426	11,820
Intermediate Industries	68,361	75,093
Pulp & Paper	37,318	98,969
Chemicals & Chemical Prod.	27,703	86,024
Petroleum & Coal Products	314,236	54,258*
Rubber & Rubber Products	26,956	49,195
Plastic Products	22,984	35,964
Non-metallic Minerals & Pr.	35,758	50,668
Iron & Steel Industry	137,105	157,082
Non-ferrous Metals (Al.)	99,343	68,588 (90,010)
Mechanical Industries	16,856	31,426
Metal Products	19,161	34,730
Machinery (excluding Elec.)	12,841	29,185
Machinery & Electric Equip.	18,624	33,410
Motor Vehicle & Transp. Ind.	14,668	28,382
Residual Group	14,281	26,595
Graphic Arts	17,154	33,642
Others	8,066	19,549
Total	32,246	40,576

Source: calculations based on data from:

1. III Encuesta Industrial 1971, CORDIPLAN
2. VII Encuesta Industrial 1977, Caracas, 1980.

* the results seem to be too low, probably due to miscalculations by OCEI (petroleum & coal products have been always above the average for the group).

TABLE 67

GROSS PRODUCTION VALUE / FIXED CAPITAL

SECTORS	1971	1977
Traditional Industries	4.38	6.25
Food	4.32	6.70
Beverages	4.51	3.87
Tobacco	9.58	6.66
Textiles	2.69	2.80
Clothing	7.67	10.76
Leather & Leather Products	4.31	7.48
Footwear	6.72	7.20
Wood Products	3.55	3.87
Furniture	6.56	6.91
Intermediate Industries	2.11	5.21
Pulp & Paper	2.91	1.87
Chemicals	3.32	4.30
Petroleum & Coal Products	2.80	23.61
Rubber & Rubber Products	3.25	2.62
Plastic Products	2.62	3.32
Non-Metallic Minerals	1.71	2.32
Iron & Steel	0.75	1.06
Non-Ferrous Metals (AL)	1.01	2.60
Mechanical Industries	5.54	5.73
Metal Products	3.38	3.62
Machinery (excluding Elec.)	4.41	4.73
Machinery & Electric Equipment	5.11	4.38
Motor Vehicle & Transp. Equip.	9.70	10.20
Residual Group	3.90	4.19
Graphic Arts	3.30	3.63
Others	6.59	4.75
Total	3.11	5.34

Source: based on data from: 1. III Encuesta Industrial 1971, CORDIPLAN, 1973
 2. VII Encuesta Industrial 1977, OCEI, 1980.

TABLE 68

VALUE ADDED / FIXED CAPITAL IN MANUFACTURING
INDUSTRIES

SECTORS	1971	1977
Traditional Industries	1.96	2.73
Food	1.54	1.67
Beverages	3.13	2.46
Tobacco	2.80	4.59
Textiles	1.49	1.45
Clothing	3.92	4.09
Leather & Leather Products	1.88	3.02
Footwear	2.83	2.71
Wood Products	1.60	1.66
Furniture	3.26	2.88
Intermediate Industries	0.81	3.25
Pulp & Paper	1.38	0.87
Chemicals & Chemical Prod.	1.97	2.51
Petroleum & Coal Products	0.50	14.61
Rubber & Rubber Products	1.77	1.28
Plastic Products	1.33	1.71
Non-Metallic Minerals & Pr.	1.09	3.41
Iron & Steel Industry	0.38	0.46
Non-Ferrous Metals (Al.)	0.53	1.13
Mechanical Industries	2.51	2.13
Metal Products	1.76	1.57
Machinery (excluding Elec.)	2.43	2.38
Machinery & Electric Equip.	2.57	1.77
Motor Vehicle & Transp. Equip.	3.71	2.79
Residual Group	2.21	2.44
Graphic Arts	1.89	1.99
Others	3.66	2.89
Total	1.33	2.64

Source: based on data from: III Encuesta Industrial 1971, CORDIPLAN, 1973

VII Encuesta Industrial 1977, OCEI, 1980.

On the other hand it has to be remembered that

factor prices do not reflect the abundance or scarcity of labor or capital because of market imperfections. In Venezuela, the high wage level, which was initiated by the oil industry and whose spread was supported by trade unions and other political elements, does not reflect the scarcity of labor. In addition, the depressed interest rate, due to the government ceiling, does not reflect the abundance of capital (Hassan, 1975, pp. 106-107).

However, even if one uses 'shadow prices' to determine the abundance or scarcity of different production factors, the tendency towards rapidly increasing labor costs in Venezuela has to be regarded in decision-making.


In 1961 the IBRD's Mission claimed that

the only major cost elements favorable to Venezuela are the relative cheapness of domestic materials of mineral origin, and the low transport charges, which are equal to or below those in the U.S. (IBRD, 1961, p. 204).

Yet, Venezuela had to import all basic inputs for aluminum smelting, excluding energy, and the industry could not benefit from the country's 'cheap' raw materials. Venezuela lacked also technology and its internal market was too small to justify an efficient scale of production for aluminum smelting.

While the traditional concept of comparative advantage does not explain the main reasons behind the creation of the country's aluminum industry, a 'modified' concept based on the existence of potential resources, including hydro power and bauxites, and export markets, may offer more insight into the Venezuelan case and could still justify the industry's creation.

According to the product cycle theory aluminum could be classified as a mature product. The theory would further suggest that Venezuela as a developing country has comparative advantage in production of mature - and Ricardo goods and therefore the choice of aluminum could be supported.



However despite claims on the part of Venezuelan decision makers, it was the Venezuelan government which was attracted to perceived prospects for the aluminum industry rather than the industry itself by favourable conditions in Venezuela.

The Venezuelan aluminum industry, similarly to the Guayana development program, was to fulfill both national and regional goals. At the national level it was hoped that a new efficient industry would be created which would further diversify the country's economic structure and promote new industrial exports. The national objectives reflected the government's willingness to promote 'export substitution' policies in order to reduce negative effects of import substituting industrialization. At the regional level the aluminum industry was to become the second largest 'propulsive' industry in Guayana after iron and steel. Aluminum constituted an integral part of the Guayana program and it was to be used to stimulate other investments in the region. The CVG hoped that the new industry would attract other manufacturing activities and services to Guayana, through extensive forward linkages. The fabrication of certain aluminum products requires less capital and it is relatively labour-intensive and can be undertaken on a small scale (UNIDO, 1969), therefore the chances of the region were relatively high.

The Venezuelan government was determined to build up a comparative advantage for aluminum smelting. The new industry was to be accompanied by the huge hydro-electric project which would supply cheap electricity. Alamo Blanco and Ganz have summarized the CVG's industrial policy and the role of aluminum in the following manner

Aluminum was needed to justify electric power; aluminum and

electric power were needed to justify building housing, schools and urban infrastructure (Alamo Blanco and Ganz, 1969, p. 172).

The CVG was also to become involved in the search for Venezuelan bauxite and it was charged with the expansion and future integration of the Venezuelan aluminum industry.

The Venezuelan government strengthened the country's 'comparative advantage' through other economic policies. The import substitution strategy played again an important role at the initial stages, but the government promoted 'export substitution' policies at the same time. Import duties for aluminum and aluminum products were established to protect the Venezuelan producers from foreign competition. In 1980 the import duties ranged from 50 per cent for aluminum ingot to 100 per cent for finished products (Table 69) substantially higher than in the developed countries (Table 65). The new investors have benefited from tax-breaks and the guaranteed low rates for electric energy from the government-owned power stations. The aluminum industry has also qualified for export incentives established by the government's 'export promotion' policies. The government planned to invest Bs 5,560 million in the aluminum sector in 1976-1980 which would account for 4.68 per cent of the total public investment in that period (Table 26).

The average capital requirements per ton for the Venezuelan aluminum smelters were estimated at \$3,570 - \$9,760, much above the same figures for the U.S. and other industrialized countries (Woods & Burrows, 1980, p. 44). The capital costs were enormous but they were still lower than in a troubled iron and steel industry. Aluminum was hoped to pay for other industrial projects which experienced delays and heavy losses.

TABLE 69

IMPORT TARIFFS FOR ALUMINUM & ALUMINUM
PRODUCTS IN VENEZUELA (AD VALOREM)

Primary aluminum (ingot)	50
Bar & Rod	60
Wire	
less than 1.6 mm	20
other	40
Plate, Sheet & Strip over 0.20 mm	60
Sheet & Strip under 0.20 mm	70 - 90
Aluminum Powder	1
Pipes & Tubing	70
Accessories for Tubing	50
Shapes & Parts	60
Sheet, Plate, Rod & Forging used in the construction industry	60
Containers over 300 l	50
Food Containers & Barrels	25 - 50
Cables	60
Wire - Netting	30
Household Equipment & Products	
kitchen accessories	35 - 100
washroom	35
other accessories & parts	50
Other Products	
Nails, Bolts, Screws, Nuts, Rivets	80
other	30 - 80

Source: Ministerio de Hacienda, Arancel de Aduanos - Integrado, 1980,
pp. 499 - 503.

Conclusion

The particular form of the economic space of the international aluminum industry has a distinctive influence upon the expected success of 'potential' new investors. It must be carefully investigated by prospective producers, for inappropriate decisions may be very costly.

In aluminum smelting basically similar technologies are used all over the world, despite differences in the level of economic development among countries. The term 'appropriate' technology does not have much substance in this truly international industry. However, while the basic technologies for aluminum production can be obtained in international markets, the choice of a particular process determines to some degree less or more intensive use of regional production factors. The further updating of technologies requires some form of association and cooperation with the world's major producers, who are also leaders in continually refining the technology.

The aluminum industry in the Western World has been dominated by six MNCs, which have secured their expansions upon vertically integrated operations from mining of mineral to production of final aluminum products. Aluminum smelting is a highly capital-intensive investment and generally requires large scale of operations, which has further stimulated the growth of the few big corporations.

The traditional location pattern for the aluminum industry has been characterized by location of aluminum smelters and alumina plants in

advanced countries, while bauxite has been imported from developing countries. In recent years new aluminum and alumina capacities have been built in several developing countries which seem to offer comparative advantage for the aluminum industry, especially low costs of energy. Costs of production and market access remain critical for new producers.

In developing countries the aluminum industry has become subject to more direct forms of government intervention and control. However, in the past government involvement has often been highly visible even in advanced countries, such as the United States and France. The role of political factors in the growth of the international aluminum industry has long been prominent.

Today, the most popular form of aluminum investments appears to be through joint ventures with MNCs and often with host government participation. Joint ventures reduce the capital requirements and risk of new investments.

It is predicted that the growth of aluminum consumption will continue at relatively high rates, though increases might be slower than in the 1960s and the 1970s. No major changes in aluminum technology are expected in the nearest future, but new processes are under investigation, mostly by the MNCs.

In Venezuela itself, the creation of the aluminum industry was possible only through direct government participation and support. The existence of its comparative advantage in the country may be questioned. However, Venezuela might be able to claim such advantage over less efficient aluminum producers when other related projects are completed, including hydro-power installations, alumina plant and bauxite mining.

The shortage of data on which to base reliable tests should not be used as an excuse for failing to present ideas and theories about the regional growth process

(H.W. Richardson)

CHAPTER VI

JOINT VENTURES IN VENEZUELAN ALUMINUM INDUSTRY

Because of the domination of the aluminum industry by the six MNCs, it is basically impossible for new investors or new countries to enter the international aluminum market without some form of association or assistance from those main producers. Even countries in the communist bloc have had to use the technical assistance of multi-national corporations. Pechiney for instance has offered its services to Poland, East Germany, Roumania, Yugoslavia and the USSR. The most recent talks between Alcoa and the USSR have been suspended because of the former President Carter's ban on high-technology exports to the USSR after the events in Afghanistan.

With increased consumption of aluminum by both advanced and developing countries, MNCs are generally interested in investing in new projects and engaging in cooperation with other partners which lowers risks as well as capital requirements of the new investments.

The following discussion attempts to document and evaluate the performance of the Venezuelan aluminum companies as 'potential' development agents promoting synchronized growth.

New Development Agents

The Venezuelan aluminum industry is based upon four joint ventures:

Alcasa, Venalum, Interalumina and Bauxiven. The first three involve mixed participation of public and private - foreign capital, while Bauxiven is a joint public project. The successful operation and expansion of the Venezuelan aluminum industry depends upon harmonization of interests and actions between partners to the venture and also between joint ventures themselves. The interests of regional development call additionally for increased cooperation between joint ventures and other regional actors. While the organizational structure of the joint venture is based on synchronization processes between partners, the existence of any collaboration with others is not assured.

ALCASA

The first joint venture in the aluminum industry, Aluminio del Caroni S.A. or ALCASA, was created in 1961, with participation of Reynolds Metals Co. and the Venezuelan public capital represented by the Corporacion Venezolana de Guayana (CVG). Reynolds was attracted by the prospect of lower costs of production, a new market and the host government assistance, such as guaranteed supply of energy at low prices and import protection. For the Venezuelan partner the main reasons for choosing the joint venture were economic growth, regional development, diversification and integration of the country's economy and transfer of technology (Qs, 1980).

Each partner had a 50 per cent equity share. This did not mean

however that both of them had equal responsibilities. In fact Reynolds had the dominating position as it was responsible for the plant's management and supply of main inputs for the aluminum smelting.

The first Venezuelan smelter started its operation in September 1967 and ended the first year with the production of 3,092 mt of primary aluminum. Alcasa had 320 employees of whom 230 were in Ciudad Guayana. In 1967 the company also took over one of Reynolds subsidiaries in Venezuela, an aluminum fabricating plant in Guacara, located in the Capital Region. Since its start up, expansions of the production capacity have been more frequent than originally planned. In 1968 Alcasa's phase II raised the smelter's capacity to 25,000 mt per year, phase III added another 25,000 mtpy in 1974 and phase IV completed in 1979 increased aluminum smelting capacity to 120,000 mtpy. It was mainly the Venezuelan partner who has insisted on the subsequent expansions, as Venezuelan 'ambitions' were growing. The Vth National Plan suggested Alcasa's phase V would increase the production capacity to 325,000 mtpy by 1979 (Table 70). More recent plans predict that this capacity could be achieved by 1986 and Alcasa will add first another 70,000 mtpy potline by 1983 (MW, Sept. 29, 1980 & Dec. 29, 1980).

There have been three major capital infusions in Alcasa, in 1967, 1971 and 1979. The most important was the 1979' capital increase which has also brought a new partner to the venture, the Venezuelan Investment Fund (FIV). The new capital structure is as follows

TABLE 70

GUAYANA REGION - INDUSTRIAL PROGRAM (VTH NATIONAL PLAN)
/ in Millions of Bolivars /

1. Project	ALCASA IV								
	Total	1974/79	1974	1975/79	1975	1976	1977	1978	1979
Total Investment		374.5	119.9	254.6	95.1	159.5			
Fixed Assets		310.0	119.9	190.1	95.1	95.0			
Working Capital		64.5		64.5		64.5			
Financial Sources		374.5	119.9	254.6	95.1	159.5			
Own Sources		86.0	12.9	73.1	25.8	47.3			
Contrib. to capital		64.0	64.0	-	-	-			
Public: CVG		32.0	32.0	-	-	-			
Private - local									
Private - foreign		32.0	32.0	-	-	-			
Loans: -local		43.0		43.0		43.0			
foreign		181.5	43.0	138.5	69.3	69.2			
Production (th MT)/capacity/ Volume					45	115	115	115	115
Annual increase						57.5	115	115	115
Employment					675	1,090	1,090	1,090	1,090
Annual increase						415	-	-	-
2. Project	ALCASA V								
Total Investment		1,000.0	200.0	800.0	400.0	400.0			
Fixed Assets		1,000.0	200.0	800.0	400.0	400.0			
Working Capital									
Financial Sources		1,000.0	200.0	800.0	400.0	400.0			
Own Sources									
Contr. to capit.		430.0	86.0	344.0	172.0	172.0			
Public: CVG									
Mixed: Alcasa		215.0	43.0	172.0	86.0	86.0			
Private - local									
Private - foreign		215.0	43.0	172.0	86.0	86.0			
Loans: - national									
foreign		570.0	114.0	456.0	228.0	228.0			
Production (th MT)/capacity/ Volume					45	115	325	325	325
Employment					675	1,090	1,320	1,320	1,320

Source: CVG, DEPI, V plan de la nacion, Region de Guayana, version preliminar,
CVG - programa industrial, Caracas 1976.

CVG	-	Bs	82,500,000
FIV	-	Bs	75,000,000
Reynolds	-	Bs	157,500.000
Total		Bs	315,000,000 (Qs, 1980).

It may be too early to evaluate the new capital structure and its implications, but the fact is that the addition of the FIV may undermine or seriously complicate the position of the CVG, which is no longer the only representative of public interests in regional development. The main problem is that the two government agencies operate within different economic spaces and therefore their motivations differ. The CVG's officials have already complained that the FIV is only interested in high profits in relatively short terms, while the CVG has to consider the complex economic and social aspects of the Guayana's industrial growth. On the other hand Reynolds has retained its 50 per cent equity share but the company may find it more difficult to harmonize its interests with the Venezuelan partners which compete with each other.

According to unofficial sources the Venezuelan government has not been satisfied with the ownership share in the country's first aluminum smelter and it has continued to press for further changes in the capital structure. Metals Week announced in April 1980 that

Reynolds has agreed to sell the government 30% of its holdings in Alcasa, reducing Reynolds 50% share to a minority 35% interest in the 125,000 mtpy smelter (MW, April 28, 1980, pp. 4-5).

This information was, however, imprecise and it has not been confirmed either

by the Venezuelan government or by Reynolds. Alcasa has continued to operate within the 1979' capital structure throughout 1980, but the new capital infusion has been also disputed. The news came at the end of 1980 and this time the Metals Week's sources seem to be more reliable. It has indicated that

the partners had agreed that VIF/- and only VIF - would contribute \$58.1 million in new capital to Alcasa, thereby increasing its equity from 23% to 57.7%. CVG's share will decline from 23% to 14.7%, and Reynolds' share will decline from 50% to 27.8% (MW, Dec. 20, 1980).

Such power structure will further favour the interests of the Venezuelan Investment Fund probably to the disadvantage of the CVG and Reynolds.

Besides open intervention by the Venezuelan government into Alcasa's operations the main conflict areas between the partners have been in their economic and expansion policies, management of the firm and employment policies. The Venezuelan partners have been mainly interested in rapid growth of the country's aluminum industry, while Reynolds has been less optimistic about the expansion prospects for Alcasa and more reluctant to continue investing more and more capital in the Venezuelan smelter. For Reynolds the main factors in deciding further expansion of Alcasa have been financial justification as a primary factor, market growth, trained personnel, cost-control capability and product - equipment capability (Qs, 1980). It is possible that the Venezuelan export plans might have interfered with Reynolds' international interests (Blanco & Ganz, 1969). The MNC's opposition to the Venezuelan plans has caused several delays in the expansion of the country's aluminum industry. However Reynolds'

position could be justified as Alcasa's overall economic performance has not been very impressive with rising production costs and higher than projected employment levels. Metals Week has issued two reports on the smelter's performance:

- a. the smelter had losses of about \$10 million in 1978, and until last July (1979) the company's situation seemed precarious... (since July, 1979, however) Alcasa started to turn a working profit now running \$1.2 million per month (MW, April 28, 1980, pp. 4-5).
- b. in the first 10 months it showed a \$7.9 million profit, as opposed to a \$16.5 million loss in 1979... However the company still has a short-term bank debt in excess of \$160 million and total liabilities of \$362 million (MW, Sept. 29, 1980, p. 1).

which suggests improvements in the company's financial situation.

On the other hand the very survival of the Venezuelan first aluminum joint venture and its spectacular expansion indicates that synchronization processes and cooperation between the partners have been relatively successful in spite of differences in interests and economic spaces. Alcasa's partners have been generally satisfied with their relationship and they support industrial cooperation between partners from different countries in the form of joint ventures (Qs, 1980).

VENALUM

In the early 1970s, the Venezuelan government, encouraged by relatively few problems in its aluminum industry, started looking for new partners to create another joint venture in which Alcasa would have 50 per cent capital share. The most serious considerations were given to the

Japanese firms, Mitsubishi Metal Corporation and Sumitomo Chemical Co. The intended capacity of a new aluminum smelter was planned to reach 280,000 mtpy. In August 1973 a new company was created, the Industria Venezolana de Aluminio, S.A. (VENALUM) in which the CVG participated with 20% capital share, Kobe Steel Ltd. with 35%, Showa Denko K.K. - 35%, and Marubeni Corporation with the remaining 10%. The two previously considered companies were completely excluded from the new venture. Showa Denko K.K. prepared a feasibility study proposing a production capacity of 150,000 mtpy and the use of a Japanese technology. An investment of Bs 912 million was planned over the five-year period 1974-1979 (Table 71). It was estimated that the plant would create 850 new jobs and would require an electricity input of 300,000 kW.

However, the Venezuelan government was not entirely satisfied and it pressed for renegotiation of the whole contract before any work could begin. The government wanted a majority share by the CVG and an increased capacity to 280,000 mtpy. Venezuela had ambitions to become the number one producer of primary aluminum in Latin America and it had no capital shortages in 1974 (see Chapter IV). The new agreement was signed at the end of 1974. It gave the CVG an 80% capital share and left the Japanese companies with 20 per cent. Because of its new ownership structure Venalum was classified as a public enterprise according to the Venezuelan law. Venezuelans decided also to use Reynolds' technology for the new joint venture rather than the Japanese expertise in order to avoid any risks with 'unknown partners'. The separate contracts were signed with Reynolds for purchase of technology

TABLE 71

GUAYANA REGION - INDUSTRIAL PROGRAM (VTH NATIONAL PLAN)
/ in Millions of Bolivars /

3. Project - ALUMINUM FOR EXPORT		Total	1974/79	1974	1975/79	1975	1976	1977	1978	1979
Total Investment		912.0	131.9	780.1	247.8	253.9	55.7	194.9	27.8	
Fixed Assets		848.0	131.9	716.1	247.8	189.9	55.7	194.9	27.8	
Working Capital		64.0		64.0		64.0				
Financial Sources		912.0	131.9	780.1	247.8	253.9	55.7	194.9	27.8	
Own Resources										
Contrib. to capital		190.0	76.0	114.0	76.0	38.0				
Public: CVG		38.0	15.2	22.8	15.2	7.6				
Private - national										
Private - foreign		152.0	60.8	91.2	60.8	30.4				
Loans - national										
foreign		722.0	55.9	666.1	171.8	215.9	55.7	194.9	27.8	
Production/capacity/-MT/day						75	75	75	150	
Volume							56.2	75	112.5	
Annual increase								18.8	37.5	
Employment		850				526	526	850	850	
4. Project - ALUMINA										
Total Investment		1,075.0	322.5	752.5	430.0	322.5				
Fixed Assets		1,075.0	322.5	752.5	430.0	322.5				
Working Capital										
Financial Sources		1,075.0	322.5	752.5	430.0	322.5				
Own Resources										
Contr. to capital		430.0	129.0	301.0	172.0	129.0				
Public: CVG		172.0	51.6	120.4	68.8	51.6				
Private - national										
Private - foreign										
Loans: - national										
foreign		645.0	193.5	451.5	258.0	193.5				
Production (capacity) - /th MT/						1,000	1,000	1,000	1,000	
Employment										

Source: CVG, DEPI, V plan de la nacion, Region de Guayana, version preliminar,
CVG - Industrias Manufactureras, Caracas, 1976 & 1978.

and management of the plant.

The main reasons behind the creation of Venalum were similar to those which had led to the creation of Alcasa. The Venezuelan government wanted to promote further economic growth and integrate the country's economy. It was hoped that the new venture would contribute to a change of the Venezuelan export structure as aluminum was to be mainly exported to foreign markets. The choice of the Japanese companies was not accidental as they offered a guaranteed market for the Venezuelan ingot. The 10-year contract was signed with the Japanese partners for export of 57 per cent of Venalum's production or 160,000 mtpy of primary aluminum. The Japanese importers receive preferential treatment as the export prices are based on the Alcan international price for ingot minus 6% discount and shipping costs.

The Japanese investors, though thwarted in their initial investment intentions, were additionally attracted by assistance from local government, special government guarantees, especially low prices for electricity, and generally lower capital requirements, given the extent of participation with the Venezuelan partner. They admit that they were rather forced into the present situation and desired a greater equity share, but on the other hand they had had no previous experience in the Venezuelan environment and Venalum could serve as a testing ground for future investments (Qs, 1980).

Venalum started its operations in 1978 with 132 out of 720 reduction cells to be installed in order to reach the planned capacity of 280,000 mtpy. In 1978 the new smelter produced 14,500 mt of primary aluminum and initiated first exports of ingot to Japan. Unlike Alcasa, Venalum has

been responsible for imports of main inputs for aluminum smelting. It has acquired alumina under four-year contracts with Philipp Brothers and Metallgesellschaft and through purchases from Babcock and Montanore.

The continuous government intervention in the country's aluminum industry has brought two more capital infusions which further changed the structural organisation and power in Venalum. In 1979 it was the Venezuelan Investment Fund (FIV) which suddenly became a major share-holder with over 60% capital participation in the venture. The CVG dropped to the second position, with 25% of total shares. The Japanese ownership was reduced to 14.67% though ~~two~~ former partners were added, the Mitsubishi Metal Corporation and Sumitomo Chemical Company. The subsequent capital increase in 1980 has led to the following structure:

Total capital	Bs	1,000,000,000
CVG		187,550 shares
FIV		612,450 shares
Showa Aluminum Industries		70,000 shares
Kobe Steel, Ltd.		40,000 shares
Sumitomo Chemical Co., Ltd.		40,000 shares
Mitsubishi Metal Corp.		20,000 shares
Mitsubishi Chemical Industries		20,000 shares
Marubeni Corporation		10,000 shares (Qs, 1980)

The FIV's ownership has been increased to 61.2% while the CVG's share has been reduced to 18.8%. The Japanese participation has increased back to 20%. The new capital structure of Venalum assures the dominating position

of the Venezuelan Investment Fund and its particular interests.

In the case of Venalum the government pressure has been even more pronounced than in Alcasa and the harmonization of interests, involving a greater number of partners, has been more difficult. Again there have been basic problems with competition between the CVG and FIV, with the latter gaining the upper hand. It is mainly the FIV who has set policies for the company. Those policies have not necessarily been in the best interests of other partners. The new Venalum's president who came into power in 1980 has tried to renegotiate the company's contracts for exports of primary aluminum to Japan which would eliminate the preferential treatment of the Japanese partners. He has also made important personnel changes and replaced several Reynolds' managers with Venezuelans.

The Japanese companies have been dissatisfied with the government intervention and management of the joint venture. They have complained about the lack of highly skilled, competent people at the management level, as well as lack of technical experts. On the other hand the Japanese partners have fully supported the expansion of the Venezuelan aluminum industry as shut downs of less efficient smelters in their own country have continued (Qs, 1980).

Venalum has experienced many problems not only between its partners but also with other contractors. There has not been much feeling of common interests between Reynolds who was responsible for the management of the smelter and the other partners. Reynolds had no capital share in the venture. The dispute between the new Venalum's president and two

contractors, Philipp Brothers and Metallgesellschaft, over alumina prices has threatened alumina supply for the smelter. Venalum did not want to pay agreed prices which had been set for 1980 at 15% of the Alcan's international ingot price. Instead it offered to pay only 13%. As a result of a prolonged dispute the West German firm Metallgesellschaft has decided to take their case into arbitration before the International Court in Paris (MW, Dec. 22, 1980). If Venalum loses, its international reputation will suffer.

The future expansion of Venalum has been endangered by the delays in the Guri Dam hydro complex, though so far Alcasa and Venalum have been regarded as priority customers for the region's electricity while power shortages have already occurred in other areas.

The company's financial situation has been very serious and lack of funds has directly affected the smelter's operations. The planned expansion of the smelter's capacity to 280,000 mtpy has been postponed until 1981-82.

According to the former Venalum executive, the producer can ill afford to withhold the material. 'The company's credit problems are horrible', Castells said. 'When it needs spare parts for the pots that are onstream, it has to cannibalize pots that could be operating because parts suppliers ask for payment in cash and the company doesn't have it' (MW, Sept. 1980, p.4).

The first three years of operation have brought losses estimated at \$39 million (MW, Aug. 25, 1980), though Venalum is expected to earn \$35-40 million in 1981.

Venalum and Alcasa have operated within a similar economic space

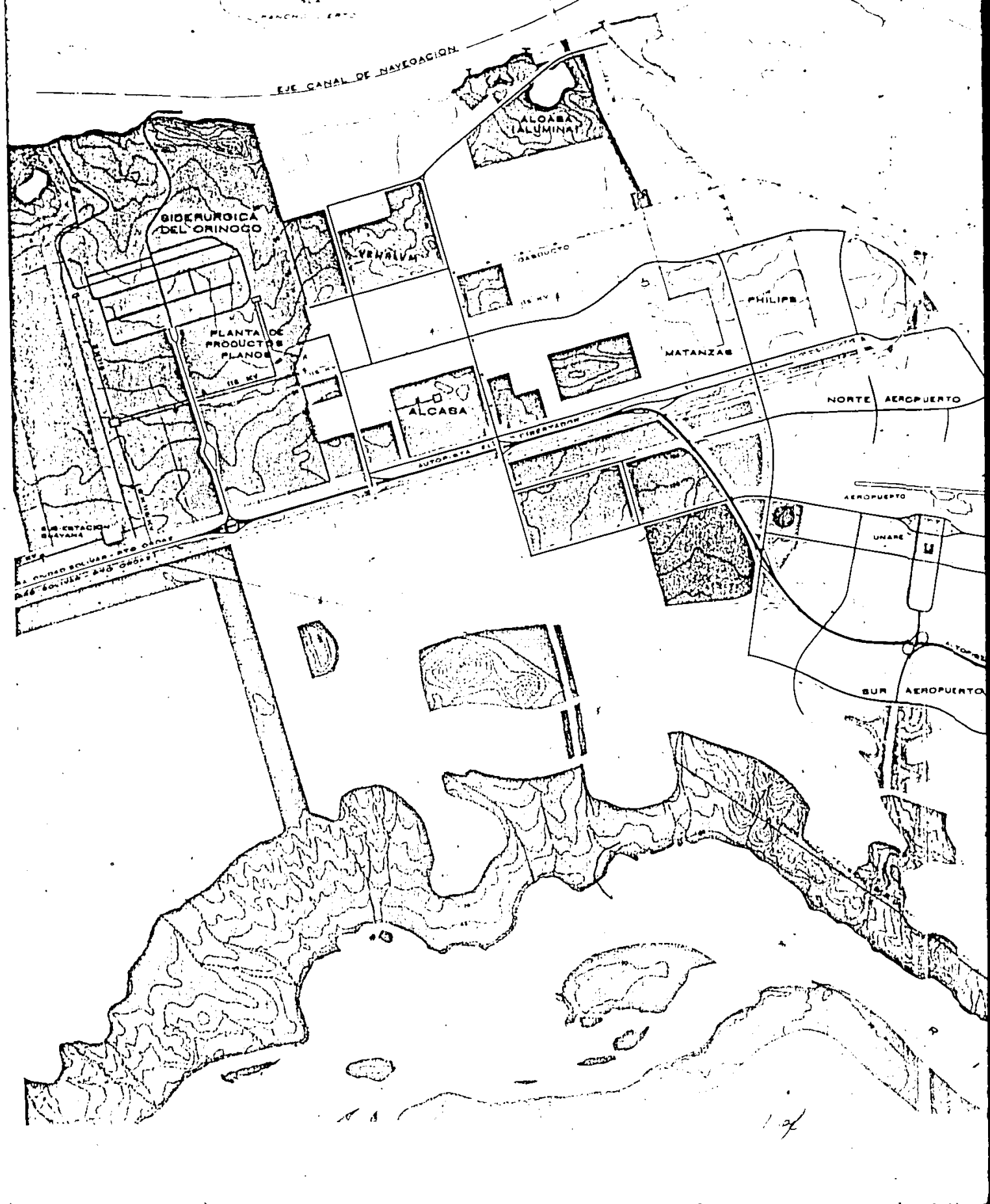
of the aluminum industry and often have experienced similar problems. The two firms have competed with each other for scarce factors such as labor and government financing. It has been a common practice in Ciudad Guayana that skilled labor, trained by Alcasa, was attracted by better working conditions offered by Venalum. If, instead, they had cooperated, it could have prevented problems encountered by Venalum not only over labor, but also over its alumina supplies and would have strengthened the position of the Venezuelan aluminum industry in international markets. It may also be that the future expansion of the two joint ventures will depend on their coordinated actions because of the strong competition from foreign producers.

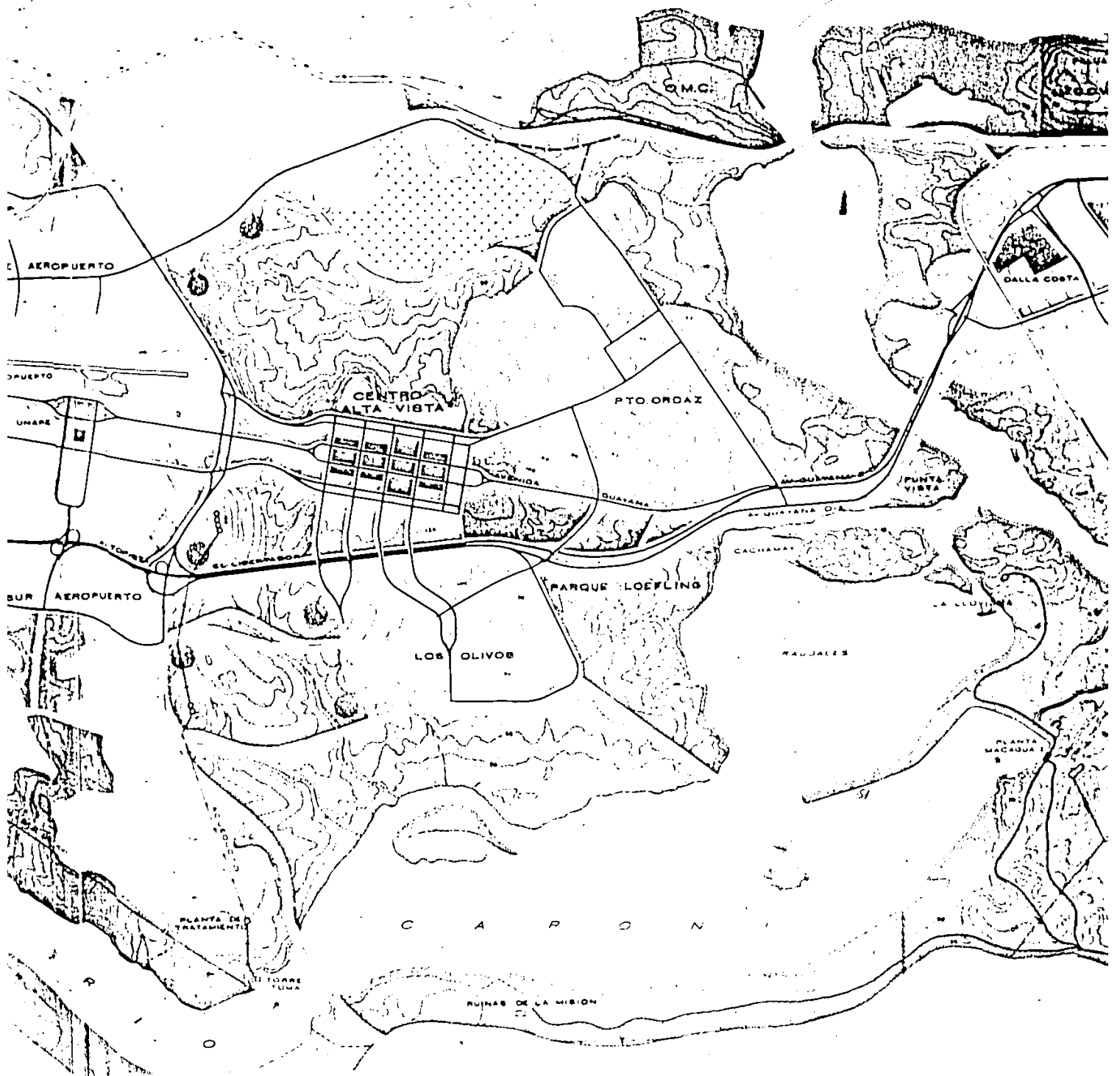
While the aluminum-ventures may not seem to have made enough progress in promoting synchronization processes, their situation is still more promising than that of other joint ventures. For example Alcanven and Venbozel had not been able to assure beneficial cooperation between partners and found themselves at a critical point in 1980, threatening their very existence (Os, 1980).

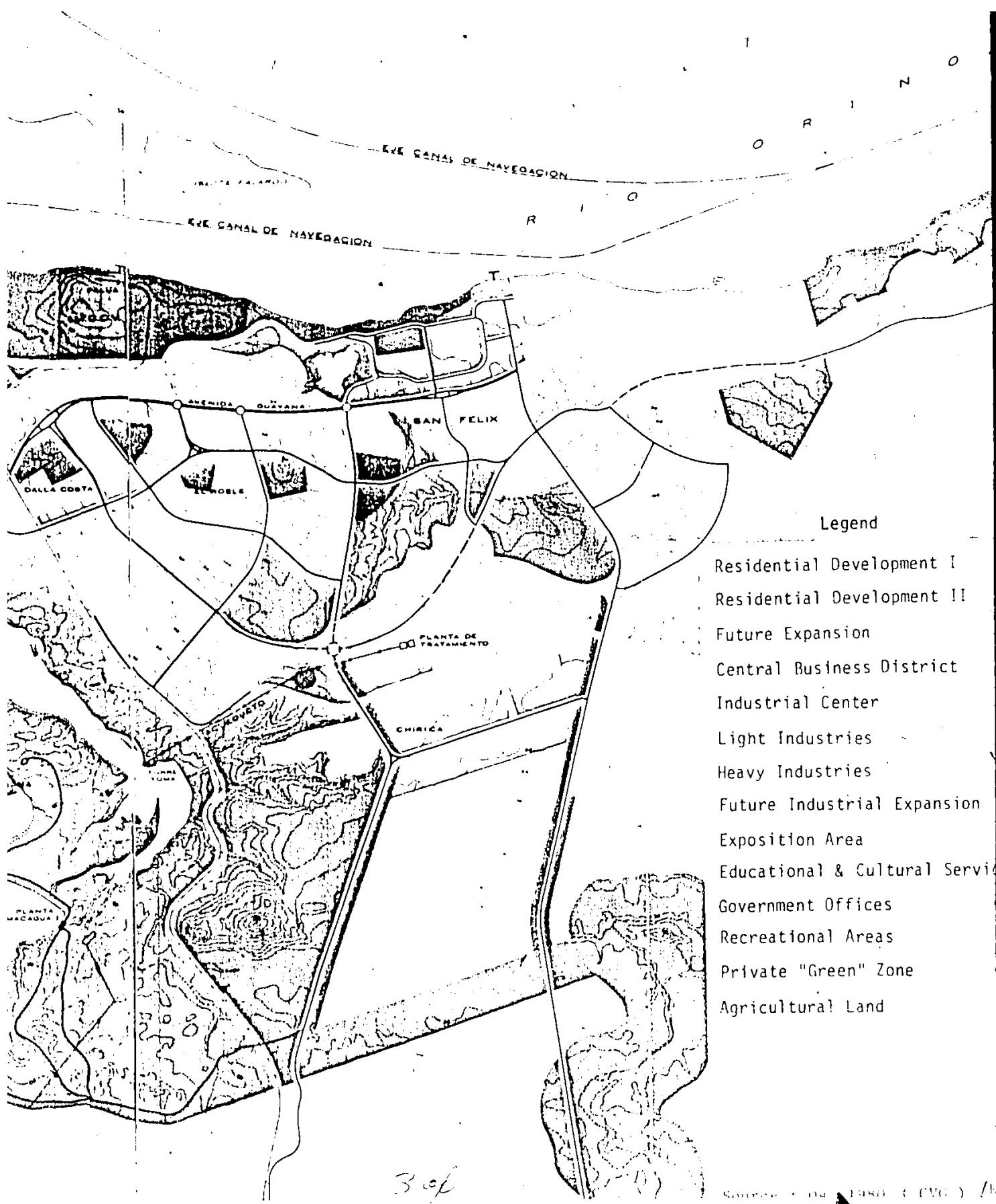
INTERALUMINA

The production of alumina has gained more attention from the Venezuelan planners since the early 1970s. At that time a more intensive search began for Venezuelan bauxites with the intention to integrate completely the country's aluminum industry, from the raw material to final product. Already in 1974, the five - year plan for the period 1974 - 1979 included an alumina plant project with a total capacity of 1,000,000 mtpy which would satisfy the total demand for aluminum oxide by the Venezuelan aluminum industry. The plant was to be located in the Guayana Region in close proximity to Alcasa and Venalum (Map 6). The CVG as the main development agent and investor

Map 6 : Ciudad Guayana, Land Use





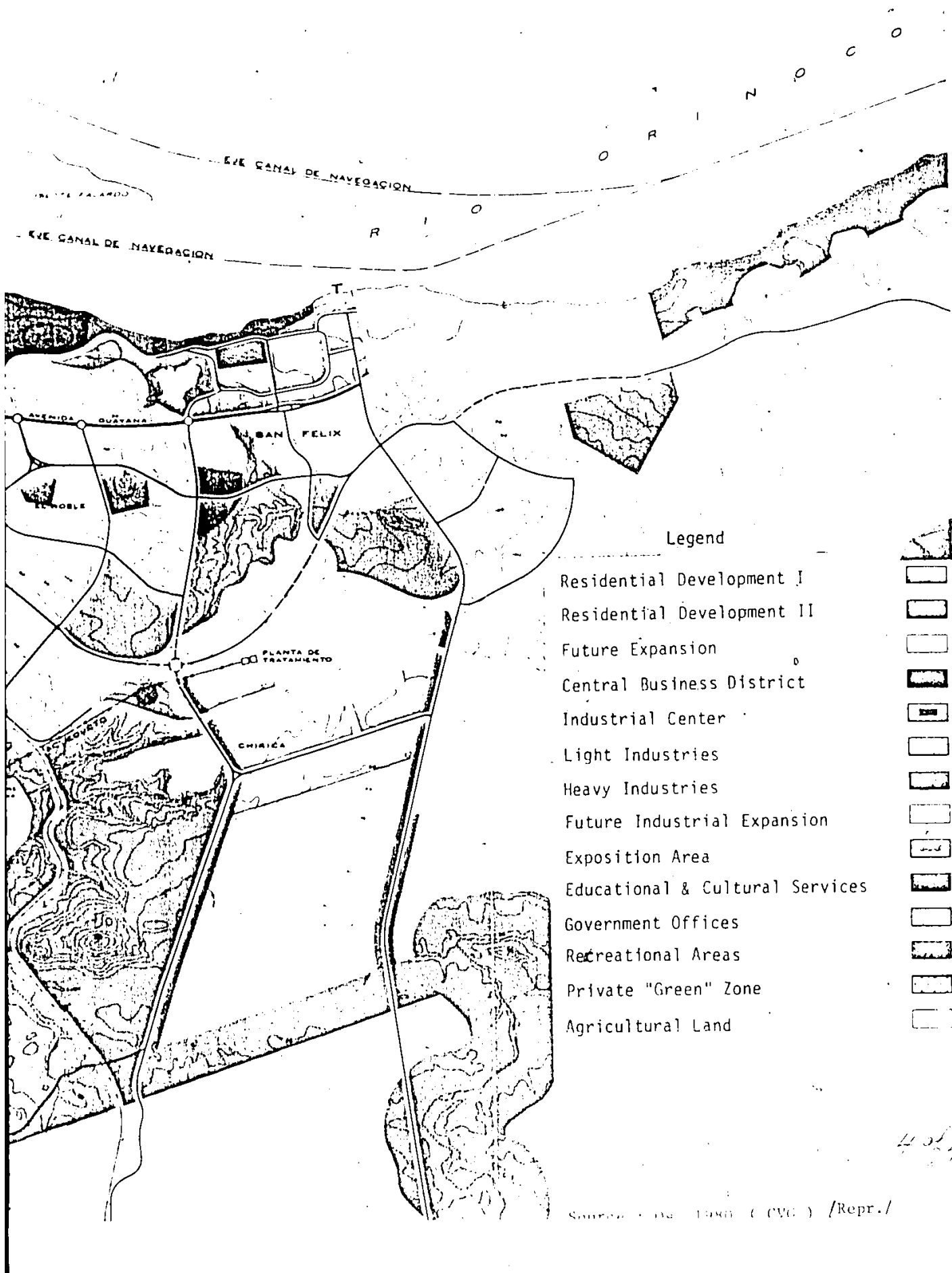


Legend

- Residential Development I
- Residential Development II
- Future Expansion
- Central Business District
- Industrial Center
- Light Industries
- Heavy Industries
- Future Industrial Expansion
- Exposition Area
- Educational & Cultural Services
- Government Offices
- Recreational Areas
- Private "Green" Zone
- Agricultural Land

3 of

Source: 1980 (PVC) /



Legend

- Residential Development I
- Residential Development II
- Future Expansion
- Central Business District
- Industrial Center
- Light Industries
- Heavy Industries
- Future Industrial Expansion
- Exposition Area
- Educational & Cultural Services
- Government Offices
- Recreational Areas
- Private "Green" Zone
- Agricultural Land

44 32 47

in the region was to participate in a new company, with a 40% share of the total capital and the remaining 60% was left to private companies. The new investment was estimated at Bs 1,075 million (Table 74).

In 1977, after prolonged negotiations with prospective partners, a contract was signed with the Swiss Aluminum Ltd. (Alusuisse) which led to the constitution of the Interamericana de Alumina C.A. or Interalumina. The new joint venture was between the Venezuelan public sector represented by the CVG with a 20% share and the FIV, 65% and Aluven, a subsidiary of Alusuisse, which held the remaining 15%.

Interalumina will have two main lines each with the capacity of 500,000 mtpy of aluminum oxide. The first line should start its operations in 1982 and the second one in 1983. It is estimated that the alumina plant will create 1,300 to 1,500 new jobs. The total investment will be over Bs 2,700 million.

The creation of the new joint venture has been motivated by the Venezuelan ambitions to fully integrate its aluminum industry and to further diversify the country's economy. It is hoped that in the future the Venezuelan bauxites will be used to produce alumina. Alusuisse was chosen over other MNCs because it could offer one of the most modern technologies for the production of alumina. The same technology was used in the Gove project, an alumina plant built in Australia by Alusuisse.

In the case of Alusuisse the availability of the Venezuelan public capital was one of the decisive factors in agreeing on cooperation with the Venezuelan partners. Alusuisse was also attracted by the growing Venezuelan

market which seemed very promising. The new joint venture has also strengthened the Alusuisse position versus other MNCs in the aluminum industry (Qs, 1980).

BAUXIVEN

The CVG's search for Venezuelan bauxites has been successful, leading to hopes it may additionally strengthen Venezuelan comparative advantage and justify the choice of the aluminum industry and its location in the Guayana Region. In 1977 the discovery of an estimated 500 million mt of bauxites in the western part of the Bolivar State, La Serrania de los Pijiguaos, was officially announced. The chemical characteristic of Venezuelan bauxites was believed to be the following:

a. 300,000,000 mt

Al_2O_3	-	50%
SiO_2	-	8% , or

b. 500,000,000 mt

Al_2O_3	-	48%
SiO_2	-	10%
and Fe_2O_3	-	12%, TiO_2 - 1.4%

(CVG, 1979, p. 4, Geovenex & Alusuisse, 1978 and 1979).

It has been estimated that bauxites from Los Pijiguaos have an advantage over imports as they are of a trihydrate variety with lower iron and quartz content. The more recent estimates have also raised the reserves

to 5.8 billion mt of ore (MW, Nov. 3, 1980).

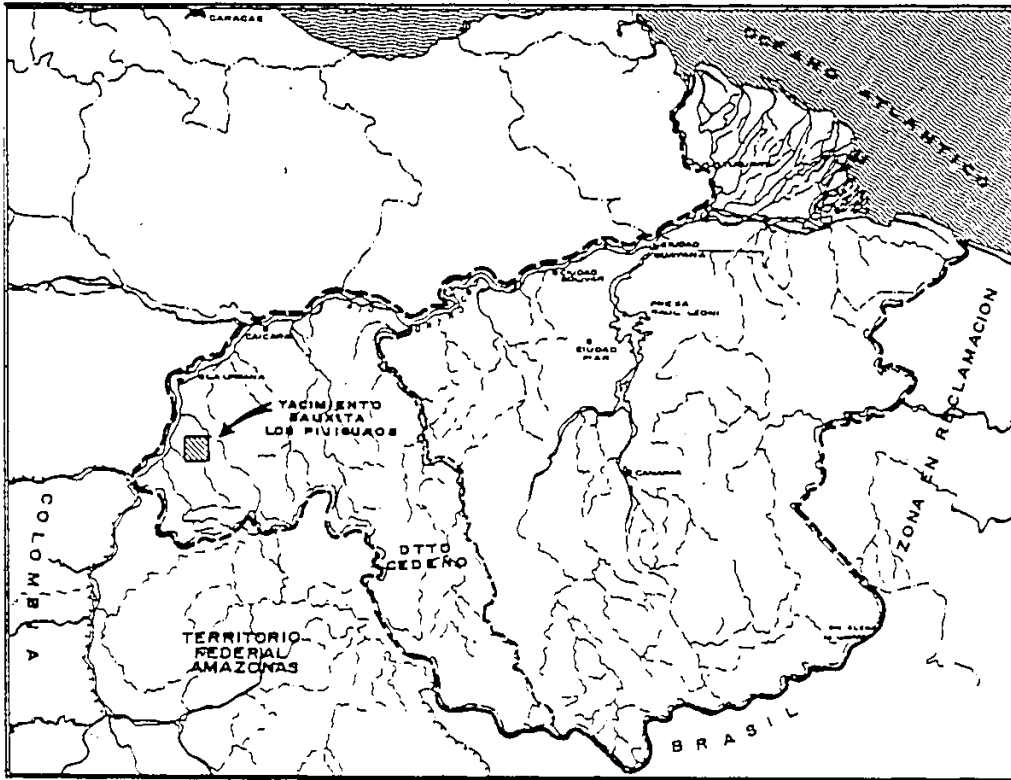
The economic efficiency of the exploitation of newly discovered resources may be questionable. There are problems for instance with transportation and basic infrastructure. Bauxites will have to be transported more than 400 miles to Ciudad Guayana (Map 7) and water transportation will not be possible without port facilities in the area of Los Pijiguaos and continuous dredging as the lower parts of the Orinoco have not been used for commercial purposes. Indeed Venezuelan bauxites might prove to be more expensive than imported ore.

In 1979 a new company was created to study and develop the Venezuelan bauxite resources - Bauxita Venezolana or Bauxiven. The total investment is estimated at \$550 million. Bauxiven does not follow the tradition of the joint ventures in the Venezuelan aluminum industry which included foreign private capital. The company has only two partners, the CVG and the FIV both representing public local capital. Despite its fully national character Bauxiven will have to depend on foreign expertise and technology similarly to other new industrial investments.

Because of very high investment costs and its large scale, Bauxiven might suffer several delays in execution of its plans. Metals Week has recently reported that

VIF is willing to finance Bauxiven once an economically desirable proposal is forwarded to them. VIF has refused Bauxiven financing to date because the plan proposed previously was too costly (MW, March 2, 1981, p. 3).

Map 7 : Guayana Region and Los Pijiguaos



Source : Qs, 1980 (CVG) /repr./

Conclusion :

Progress in Synchronization Processes

The Venezuelan joint ventures have run into some serious problems in promoting coordination of interests and actions both between partners to the venture as well as with other development actors.

In the cases of Alcasa and Interalumina the results from one perspective may be judged positive, with both companies maintaining relatively stable organizational structures. Yet, recent developments suggest Alcasa's partners are becoming less satisfied with the joint venture's situation. The continuous intervention by the Venezuelan government and the forced changes, including introduction of a new partner (FIV), threatens the successful cooperation that previously prevailed between the two partners to the venture. Any further reduction of Reynolds' ownership share may also reduce the MNC's interests in future dealings with Venezuela.

From another perspective the results of the Alcasa joint venture seem negative as Reynolds continues to be responsible for all major decisions and there has not been any significant shift in decision-making process and in transferring Reynolds' powers to the local partner. Venalum, on the other hand, shows signs of positive developments insofar as the company's growth depends more on the decisions taken by the Venezuelans. This however does not mean that those decisions are necessarily better or more 'rational', compared with actions which could have been taken by foreign partners.


Complicating any assessment is the management contract with Reynolds, which is not a partner to the Venalum venture and therefore is probably less interested in cooperating with other participants. Additionally, Venalum has been even more than other joint ventures, subject to continuous government intervention with structural changes imposed upon the foreign partners without their full consent and approval.

The aluminum joint ventures have made little progress in initiating cooperation between themselves and with other development actors. Most coordination efforts have been taken by outside institutions, such as the CVC and FIV, which may again force certain forms of institutionalized cooperation upon the aluminum companies in future, including perhaps a possible merger of the Venezuelan joint ventures.

Joint Ventures' Role in Regional Development

According to the proposed synchronized growth strategy progress in regional development depends not only upon introduction of new institutions and increased economic cooperation, but also upon the ability of newly created development agents to expand continuously their economic spaces. Profit maximization is of less importance in a short term and at the initial stage of regional growth when other objectives are more emphasized. These may include creation of new regional employment and generation of additional incomes. On the other hand in Venezuela economic efficiency of the new development agents should become an important criterion in evaluation of their performance, especially in a long run. In the case of joint ventures, the very participation of private capital and growth of export should guarantee the satisfaction of 'profitability criteria'.

As noted earlier in Chapter II, the economic spaces of development agents depend on the extent and form of economic relations with other partners in development. Unfortunately, as it has been noticed, there is no single measure yet that could give us the precise assessment of changes occurring within economic spaces. Here more traditional methods and ratios will be used which do, however, indicate important trends in economic spaces of the development agents.



Economic Growth

The aluminum industry is the second largest manufacturing sector in the Guayana Region and its existence is vital for the growth of the new city. In 1976 Alcasa contributed 10.4% to the gross production value of Guayana's manufacturing and its value added accounted for 11.91% of the total value added of Guayana's industries (OCEI, 1980).

The growth of the Venezuelan aluminum industry has been spectacular especially in recent years, as both joint ventures have expanded their outputs at very high rates. Alcasa has managed to increase its production of primary aluminum from 10,282 mt in 1968 to 45,596 mt in 1974 and to over 100,000 mt in 1980 (Table 72 and Figure 11). In the 1970s the company's growth of output was rather steady and only in one year did Alcasa experience a decrease in production, a decline of almost 7% in 1977 which was mainly due to a labor dispute. In 1978 the production of aluminum recovered and went up by 37% over 1977. Alcasa has also increased its fabrication capacity to 25,000 mt in 1979 (Qs, 1980). The fabricating plant located in Ciudad Guayana manufactures extrusion billets, can stock, plates, strips, circles, coiles and sheets while Alcasa's plant in Guacara produces mainly commercial and household aluminum foil. Venalum has increased its output from 14,500 mt in 1978, to 114,000 mt in 1979 and 218,000 mt in 1980. The company produces mainly aluminum ingot.

Though several delays occurred in the execution of the joint ventures' production plans, the aluminum industry has been more successful

TABLE 72

PRODUCTION OF ALUMINUM IN VENEZUELA (in MT)

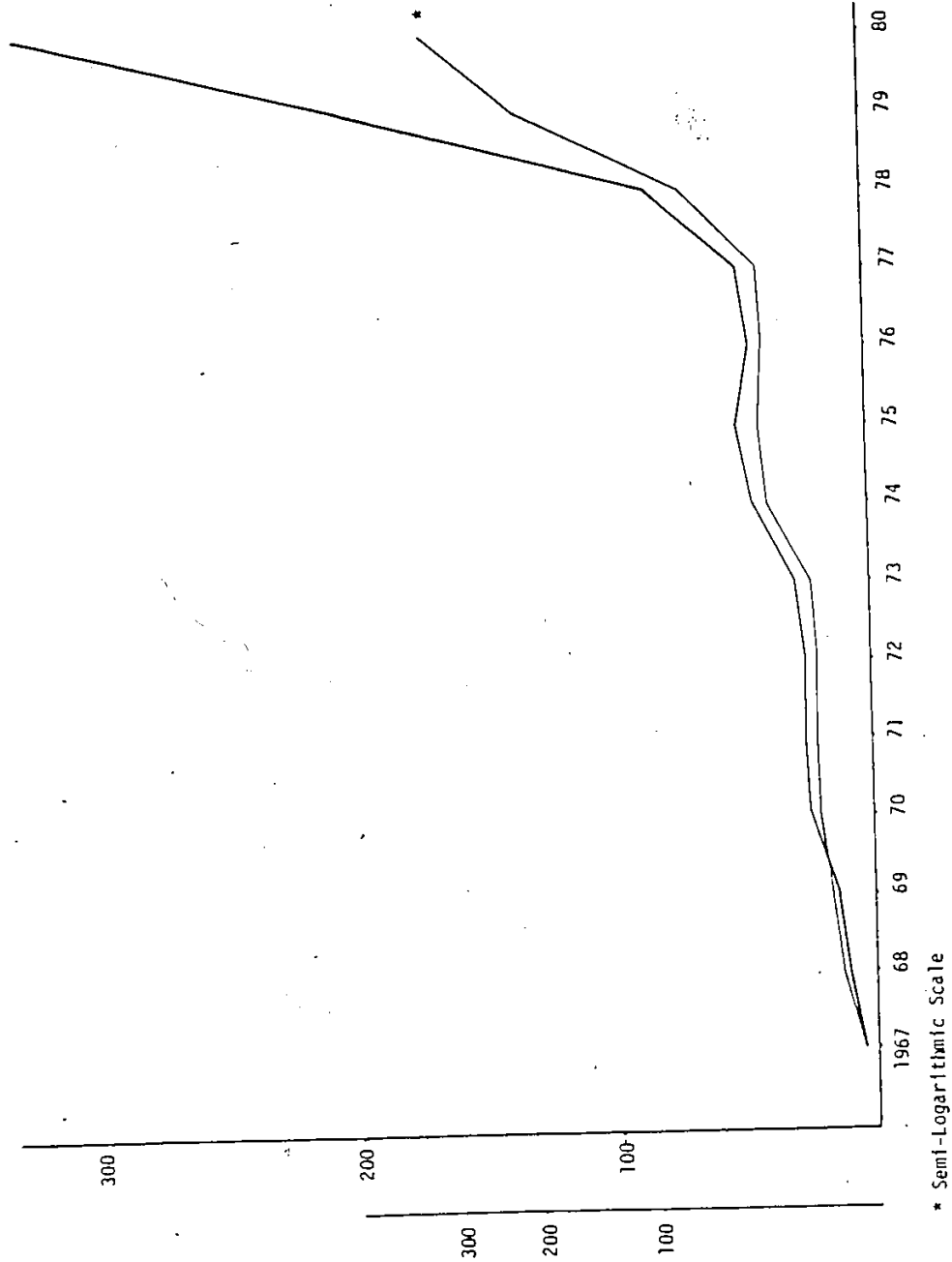
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Primary aluminum	3,092	10,282	13,170	22,385	22,446	23,301	27,686	45,596	49,698	45,338	48,949	80,000	202,000	327,000
Alcasa	3,092	10,282	13,170	22,385	22,446	23,301	27,686	45,596	49,698	45,338	48,949	65,900	88,000	109,006
Venalum												14,500	114,000	218,000
Ingot for extrusion	1,875	4,252	4,252	8,243	10,148	7,548	10,072	13,848	13,895	16,188	13,761			
Ingot for sheet rolling	541	2,505	2,505	3,567	3,194	3,137	15,935	18,529	14,434	2,960	12,370			
Ingot for remelt	5,962	4,859	4,859	7,054	5,423	6,362	10,372	20,052	20,502	18,187	22,816			
Semi fabricated products; sheet & foil	523	532	532	2,578	4,805	7,435	7,503	7,466	13,233	9,260	10,720			
							2,376	2,967	3,483	4,104	3,324			

Index (1967 = 100)	100	333	426	724	726	754	895	1,475	1,607	1,466	1,583	2,587		10,921
1970 = 100	14	46	59	100	100	104	124	204	222	203	219	357		1,508

Sources: 1. Informes Anuales CVG, 1967... 1978; 2. Hierro y Otros Datos Estadísticos Mjneros, Ministerio de Minas e Hidrocarburos; 3. Breviario Estadístico 1977 & 1978, OCEI; 4. Anuario Estadístico 1977 & 1978, OCEI; 5. Informes Económicos, BCV, 1970...1978; 6. Qa, 1980; 7. World Metal Statistics, 1980.

* Estimated production for 1980.

Figure 11 : Production of Aluminum in Venezuela (In Thousand Metric Tons)



in meeting the initial production targets of the Guayana's development program than other regional industries (Table 73). For instance the iron & steel industry and the main producer of the Venezuelan steel, SIDOR, has experienced serious problems which resulted in declines in its output (Table 74). SIDOR is also the largest public enterprise, owned wholly by the State.

The accelerated growth of the aluminum industry should contribute to the diversification of the national and regional production structures, as the new industry has tended to grow at higher rates than other sectors. And finally it suggests that Alcasa and Venalum have made significant gains in their economic spaces. However, other aspects of their expansion have to be analysed to confirm the validity of this point.

National and Regional Linkages

The Venezuelan aluminum industry has been more successful in developing 'forward' rather than 'backward' linkages with the country's economy (Figure 12), except for electricity inputs.

Most of the material inputs required for aluminum smelting have been imported from other countries. In 1978 the inputs of national origin constituted only 3.15 per cent of the total required materials (Table 75), while the remaining 96.85 per cent was of foreign origin. Alcasa has imported alumina from Reynolds' plants in the U.S. and Jamaica; cryolite has been delivered by Kaiser and Mitsui; aluminum fluoride by Kaiser and

TABLE 73

PRODUCTION TARGETS FOR GUAYANA INDUSTRIES

	Before	firm		potential	
		1975	1975	1980	1975	1980
Thousands of Metric Tons					
Iron ore	45,000	27,000	27,000	32,000	32,000
Pre-reduced enriched ore	-	5,000	10,000	5,000	12,000
Sponge iron	10,000	2,100	4,100	2,100	4,100
Steel	4,760	2,080	4,000	3,000	6,600
Aluminum	200	16	21	30	86
Pulp	-	33	50	60	130
Ammonia	200	-	-	330	330
Phosphorus	50	-	-	-	-
Millions of Bolivars					
Heavy machinery	1,800	160	230	300	420
Megawatts of Power Capacity					
Guri & Macagua Dams	1,945	1,770	2,120	1,770	2,120

Source: Alamo Blanco & Ganz, 1969, p. 68; CVG, 1966 & 1978.

TABLE 74

IRON & STEEL INDUSTRY: VOLUME OF PRODUCTION (IN TH MT)

PRODUCTS	1970	1971	1972	1973	1974	1975	1976	1977	197
Cast-Iron	510	515	534	534	559	535	427	351	418
index (1970 = 100)	100	101.0	104.7	104.7	109.6	104.9	83.7	68.8	82
Steel	789	771	964	907	895	919	754	679	698
index (1970 = 100)	100	97.7	122.2	115.0	113.4	116.5	95.6	86.1	88
Iron Pipes	-	8	16	19	23	19	23	17	
Steel Pipes	128	177	95	85	102	83	90	74	
Mouldings	50	73	100	95	109	95	87	77	
Bars	156	172	202	227	240	213	199	177	
Wire	77	59	69	56	58	59	67	46	
Sheet (thick)	-	-	-	4	48	78	80	81	
Hot - rolled Coil	-	-	-	-	23	45	119	82	
Raw Coils	-	-	-	-	27	2	6	14	
Cold - rolled Coils	-	-	-	-	22	1	84	82	
Hot - rolled Sheet	-	-	-	-	24	58	47	56	
Cold - rolled Sheet	-	-	-	5	1	106	66	51	
Others	-	-	-	25	-	39	90	89	
Total	1,710	1,715	1,980	1,957	2,131	2,252	2,139	1,876	
index (1970 = 100)	100	100.3	115.8	114.4	124.6	131.7	125.1	109.7	

Source: based on information from: 1. C.V.G. Siderurgica del Orinoco, (SIDOR) and
2. CVG, DEPI & DDI, 1980.

Figure 12 : Simplified Linkages in the Venezuelan Aluminum Industry

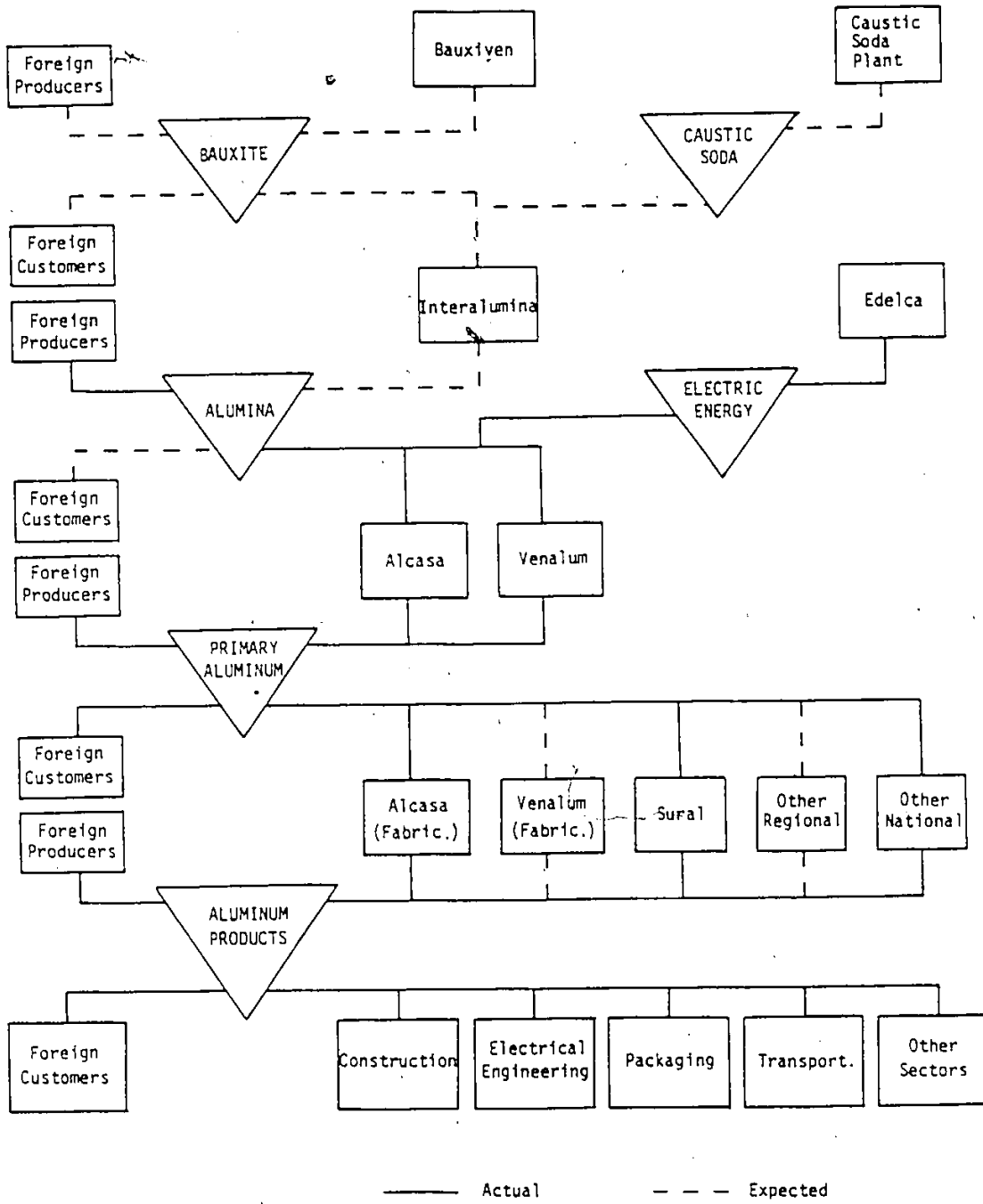


TABLE 75

IRON & STEEL AND ALUMINUM INDUSTRIES (GUAYANA REGION)

	SIDOR		ALCASA	
	1977	1978	1977	1978
Consumption of Raw Materials (Millions of Bolivars)	850	896	69	127
National	189	230	4*	4*
Imported	661	666	65	123
Labor Costs (Millions of Bolivars)	456	709	70	116
Wages	265	308	48	76
Contributions	32	62	4	9
Social credits	44	63	18	31
Utilities	68	70	-	-
Other	47	206	-	-
Employment (number of persons)	13,423	15,831	2,013	2,289
Personnel	5,067	7,495	665	749
Workers	8,356	8,336	1,348	1,540
Wages per employee/month in Bs	2,833	3,666	2,917	4,202

Source: based on information from : 1. BCV, Informe Economico 1978, Caracas 1979
2. Anuario Estadistico 1978, OCEI, Caracas, 1980.

* excluding energy inputs.

Industria Quimica de Mexico; coke (calcined petroleum) by Reynolds and pitch by Allied Chemical, USA under long term contracts (Qs, 1980). In the case of Venalum, alumina has been imported from Surinam and Jamaica; cryolite from Mexico and Tunisia; coke from the U.S.; aluminum fluoride from Mexico and other inputs from various countries. Venalum has signed medium-term contracts for the delivery of alumina, cryolite and aluminum fluoride and other inputs have been purchased through the free market (Qs, 1980 & U.S. Bureau of Mines, 1980).

The backward linkages of the aluminum industry are limited to the purchases of electricity which will be discussed later in the study. The very construction of the two smelters had little impacts on other national industries, as in both cases most of the machinery and equipment was imported with little national content of approximately 20 per cent (Qs, 1980).

The present situation should change when Venezuela starts its production of alumina which is the major material input in aluminum smelting. Alumina accounts for close to 40 per cent of the total production costs. 'Backward' linkages should develop further when exploitation of Venezuelan bauxites begins in Los Pijiguaos. The government is also determined to promote the national production of the other materials required by the aluminum industry. Among others the economic 'feasibility' of caustic soda manufacturing has been studied by the Venezuelan planners and according to Metals Week:

VIF is also studying the possibility of constructing a \$150 million caustic soda plant in Puerto la Cruz, in a joint venture with the state oil monopoly Petroleos de Venezuela (MW, March 2, 1981, p. 1).

The Venezuelan joint ventures have managed to increase significantly their national sales of aluminum and aluminum products and to develop 'forward' linkages with other sectors of the economy. The country's consumption of aluminum has increased from 10.8 thousand mt in 1968 to 74.0 (45.0) thousand mt in 1978 (Table 76). At the same time the per capita consumption has jumped from 3.2 lb to 12.8 lb. National customers were more important for Alcasa than for Venalum. In 1968/69 Alcasa's national sales of aluminum and aluminum products represented close to 90% of its total sales and the other 10% was exported. In 1975 the proportion of the company's national - to foreign clients was 75% to 25%. This trend has been reversed in recent years and in 1979/80 exports were more important for Alcasa than national sales, as the former accounted for 65% of the total sales and the latter for 35% (Qs, 1980). It is expected that in the 1980s the local market will dominate over exports, as the demand for aluminum tends to grow at high rates. Unlike Alcasa, Venalum's production has been planned mainly for exports. In 1980 close to 34 per cent of the total sales has been destined for the national market. However, because of the large volume of Venalum's output, its national role may be as important as Alcasa's.

The main national customers of the Venezuelan aluminum industry were:

- a. the construction industry which bought almost 46% of the aluminum and aluminum products, manufactured by Alcasa;
- b. electrical engineering which accounted for 29% of Alcasa's national sales;

TABLE 76

CONSUMPTION OF ALUMINUM IN VENEZUELA

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Total Consumption (th MT)	10.8	14.6	12.8	17.3	19.4	26.9	30.9	38.3 (38.4)	52.4 (44.0)	61.5 (52.0)	74.0 (45.0)	(60.6)
Index	100	135	119	160	180	249	286	355	485	569	685	
Consumption per capita (lb.)	3.2	2.6	2.7	3.2	3.6	4.4	5.1	7.2	7.2	10.0	12.8	
Index	100	81	84	100	113	138	159	225	225	313	400	

* figures in brackets based on World Metal Statistics, December 1980, p. 14.

Source: calculations based on data from ALCASA, Aluminio del Caroni, S.A., 1980 (Qs, 1980).

- c. packaging with 19%; and
- d. transportation which consumed the remaining 6% (Table 77).

Venalum had one principal national customer - Sural, C.A., a joint venture established between private Venezuelan capital and a foreign company, Southwire Corporation. Sural has a long term contract with Venalum for purchases of approximately 50,000 mtpy of Venalum's aluminum to produce wires. In 1980 it bought 55,000 mt of aluminum, estimated at over Bs 350 million (Table 78). The ties with the country's economy should be additionally strengthened once Interalumina starts its operations. Its final product, alumina, can be used not only by the aluminum industry but also by the chemical industry, glass and porcelain industries, for refractory brick and fine clays, polishing, in textile dyeing and so on.

There are also good prospects for developing 'forward' linkages with the regional economy. The aluminum industry should attract other investors to the Guayana Region through generation of external economies and further development of Guayana's infrastructure. The location of Sural in Ciudad Guayana signifies that the industry is capable to attract also private capital much needed in the region. Sural started its operation in 1977 and initially depended on Alcasa's aluminum.

The regional demand for aluminum has been also created by the government's arbitrary decisions. For instance the government regulations bound the constructors of the transmission line between Guri and Santa Teresa to use aluminum from Alcasa which accounted for 30% of the line.

TABLE 77

SALES OF ALUMINUM PRODUCTS BY ALCASA (estimates)

NATIONAL MARKET

	1977/78 mt	1978/79 mt	1979/80 mt
Construction	20.435	19.575	25.970
Electrical Eng.	14.216	8.800	16.600
Packaging	3.866	3.578	10.629
Transportation	<u>2.478</u>	<u>2.979</u>	<u>3.180</u>
Total	40.995	34.932	56.379

Source: Questionnaires, 1980

TABLE 78

SALES OF ALUMINUM BY VENALUM (1980)
(Estimates)

	<u>In Metric Tons</u>	<u>In Thousands of Bs.</u>
1. Ingot (20kg)		
National Market	12,000	84,000
Japan	100,000	660,000
Other (Free Market)	12,000	
2. Ingot (454 kg)		
National Market	3,000	24,000
Japan	20,000	132,000
3. Billets (Bars)		
National Market	3,000	20,000
Other (Free Market)	12,000	
4. Liquid Metal		
Sural	55,000	352,000
TOTAL	217,000	1,272,000 *

* does not include free market sales.

Source: Questionnaires, 1980.

The future integration of the Venezuelan aluminum industry will further support not only the growth of Ciudad Guayana but also will promote development of more remote areas of the Bolivar State. The exploitation of the Venezuelan bauxites will require creation of a new settlement, perhaps a mining town in the area of Los Pijiguaos. A basic infrastructure and port facilities will be needed to handle raw materials. The commercial navigation of the lower Orinoco River may open new opportunities for others. The aluminum industry may indeed have a very significant contribution in changing the spatial organization of the Venezuelan South.

Consumption of Energy

One of the main contributions of the aluminum industry to the further growth and integration of the regional economy has been through its purchases of electricity. Indeed the industry was even used to justify the development of the new hydro complex in Guayana.

The demand for electricity has grown rapidly since the creation of the first aluminum joint venture. Alcasa has bought energy from Edelca, a public enterprise which supplies electricity from the two hydro installations, based on the Macagua and Guri Dams. In 1968 Alcasa consumed 218.8 thousand kWh of electric energy, which constituted 8.13 per cent of the total energy sales by Edelca (Table 79). Although Alcasa was an important regional consumer for Edelca, it stood still well behind the iron & steel industry, which does not use as much energy as aluminum smelting on a per ton output

TABLE 79

GENERATION AND CONSUMPTION OF ENERGY (in Thousands of KWH)

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	% (1974)
Total production (EDELCA)	1,537	2,690	3,113	4,057	5,373	6,020	6,159	7,285	8,403	9,917	11,203	11,463	100
Local consumption & Losses (EDELCA)	97	136	149	194	277	257	327	520	509	545	759	698	6.05
Total consumption	1,493	2,554	2,964	3,863	5,096	5,763	5,831	6,764	7,893	9,372	10,444	10,765	93.91
Sidor	1,146	1,696	1,578	1,561	1,588	1,770	1,671	1,633	1,647	1,622	1,349	1,429	12.47
Index 1967 = 100	100	148	138	136	139	154	146	142	144	142	118	125	
Alcasa	62	219	318	431	434	448	539	881	961	892	862	1,293	11.24
Index 1967 = 100	100	353	513	695	700	723	869	1,421	1,550	1,439	1,390	2,085	
Venalum											14	336	2.97
Cadafe (regional)	66	76	94	107	130	142	164	162	199	237	322	381	3.31
Cadafe (interconn)	84	493	914	1,418	2,079	2,376	2,835	3,159	3,613	4,543	5,318	4,554	39.72
Caracas - electricity	-	-	-	295	803	898	467	751	1,266	1,801	2,125	2,252	19.67
Industrial use (reg.)	34	35	42	51	61	101	136	164	192	266	221	291	2.57
Venbozel											231	228	1.91
Construction of Guri	48	34	17	-	-	-	20	14	16	11	2	2	0.01

Source: calculations based on information from: CVG EDELCA, Informes Anuales 1968,... 1978; Caracas 1969-1979, and CVG, Estadísticas de la Región Guayana, 1978.

basis. For example, in 1968 Sidor, a main producer of steel, bought 1,696.1 thousand kWh of energy or 64.05% of the total energy generated by Edelca. These proportions have changed over the years with the growth of the Venezuelan aluminum industry and in 1978 the aluminum smelting became the major regional consumer of energy. Alcasa bought 1,292.84 thousand kWh which accounted for 11.28 per cent of Edelca's energy (Table 79 and Edelca, 1980). Venalum consumed another 336.28 thousand kWh or 2.97%. These figures do not indicate still the significance of the joint ventures' local role, for in 1978 more than 50% of the electric energy produced by Edelca was exported to other parts of the country, mainly to the central and western regions of the country. Caracas received 19.64% of Edelca's energy and Cadafe Interconexión 39.7%.

The relative importance of the aluminum industry will further increase when Venalum reaches its full capacity of 280,000 mtpy which will require over 5,500 thousand kWh of electric energy. The two smelters may account then for over 50% of Edelca's supplies of energy.

Both smelters receive preferential treatment and have special contracts which guarantee low rates for electricity. For instance in 1978 Alcasa paid less than Bs 0.01 for 1 kWh (Qs, 1980) while other industries, including the iron and steel industry had to pay much higher rates (see Tables 80 & 81). An increase in electricity rates charged to Alcasa and Venalum could seriously endanger the competitive position of the Venezuelan aluminum industry which has already experienced problems with keeping down the production costs.

TABLE 80

CONSUMPTION OF ELECTRIC ENERGY BY INDUSTRIES
1971

Sectors	Purchased Energy		BS/KWH
	KWH TH	BS. TH	
Traditional Industries			
Food	320,055	36,829	0.1150708
Beverages	66,387	7,161	0.1078675
Tobacco	10,328	1,171	0.1133810
Textiles	198,326	16,639	0.0838972
Clothing	25,688	3,407	0.1326300
Leather & Leather Products	10,722	1,405	0.1310389
Footwear	9,206	1,600	0.1737996
Wood Products	30,737	3,281	0.1067443
Furniture	12,561	1,930	0.1536501
Intermediate Industries			
Pulp & Paper	97,832	9,766	0.0998241
Chemicals & Chemical Prod.	187,296	15,576	0.0831624
Petroleum & Coal Products	32,891	2,967	0.0902070
Rubber & Rubber Products	62,801	6,184	0.0984697
Plastic Products	44,905	5,310	0.1182496
Non-metallic Minerals & Pr.	234,382	18,055	0.0770323
Iron & Steel Industry	1,521,201	29,402	0.0193281
Non-ferrous Metals (Al.)	441,040	5,061	0.0114751
Mechanical Industries			
Metal Products	54,847	7,140	0.1301803
Machinery (excluding Elec.)	5,271	957	0.1815594
Machinery & Electric Equip.	41,190	4,367	0.1060208
Motor Vehicle & Transp. Ind.	45,737	5,251	0.1148085
Residual Group			
Graphic Arts	20,162	3,202	0.1588136
Others	6,842	1,028	0.1502484
Total	3,480,407	187,689	0.0539273

Source: Calculations based on information from:

1. III Encuesta Industrial 1971, CORDIPLAN, 1973
2. VII Encuesta Industrial 1977, OCEI, 1980.

TABLE 81

CONSUMPTION OF ELECTRIC ENERGY BY INDUSTRIES
1977

Sectors	Purchased & Generated		
	KWh th	Bs. th	Bs/kWh
Traditional Industries			
Food	726,481	78,500	0.1080551
Beverages	113,836	17,354	0.1524473
Tobacco	18,716	2,965	0.1584206
Textiles	390,604	39,290	0.1005878
Clothing	57,226	7,944	0.1388180
Leather & Leather Products	21,666	2,418	0.1116034
Footwear	5,062	388	0.0766495
Wood Products	52,910	6,899	0.1303912
Furniture	30,698	6,090	0.1983842
Intermediate Industries			
Pulp & Paper	505,727	19,877	0.0393038
Chemicals & Chemical Prod.	319,748	32,266	0.1009107
Petroleum & Coal Products	61,512	14,138	0.2298413
Rubber & Rubber Products	93,012	10,136	0.1089751
Plastic Products	106,748	14,927	0.1398340
Non-metallic Minerals & Pr.	631,686	46,105	0.0729872
Iron & Steel Industry	1,525,778	44,697	0.0292945
Non-ferrous Metals (Al.)	862,563	10,666	0.0123654
Mechanical Industries			
Metal Products	155,261	22,029	0.1418836
Machinery (excluding Elec.)	35,285	6,065	0.1718860
Machinery & Electric Equip.	87,963	11,224	0.1275991
Motor Vehicle & Transp. Ind.	113,896	14,254	0.1251492
Residual Group			
Graphic Arts	46,910	7,477	0.1593903
Others	21,246	3,703	0.1742916
Total	6,791,594	421,987	0.0621337

Source: calculations based on information from: 1. III Encuesta Industrial 1971;
2. VII Encuesta Industrial 1977
OCEI, 1980.

On the other hand it is difficult for Edelca to adhere to the contracts imposed by the government, as serious delays in the Guri Dam hydroelectric project have occurred. There is also a growing demand for Edelca's energy from other customers which would be willing to pay much higher prices. In 1980 power shortages have already hit some areas of the country (MW, Dec. 8, 1980, p. 4).

Generation of Employment & Incomes

There are two ways of looking at employment aspects of the Venezuelan aluminum industry: from the producers' point of view higher employment levels have meant higher costs of production and therefore lower efficiency, on the other hand for the regional economy increases in employment have promoted development as additional employment has stimulated 'multiplier' effects through new incomes, more demand for other goods and services and so on.

Despite the fact that the aluminum industry is highly capital intensive, similarly to the iron & steel industry, it has contributed significantly to the creation of new jobs in the Guayana Region. (Table 82). Its relative importance has also increased over the years. In 1967 Alcasa had only 230 employees in Puerto Ordaz (Ciudad Guayana), in 1975 its employment in the region went up to 1155 people and in 1980 the company's total employment was 2640 of which 2350 people were working in Ciudad Guayana (Table 83). Venalum had 2406 employees in the same year. The subsequent

TABLE 82

EMPLOYMENT IN MANUFACTURING (GUAYANA REGION)

SECTORS	Owners & Assoc.	Directors & Managers	Personnel (Office...)	Workers (Produc.)	Others	Total
Traditional Industries						
Food	29	57	98	551	38	773
Beverages	2	4	89	123	1	219
Tobacco	-	-	-	-	-	-
Textiles	-	-	-	-	-	-
Clothing	-	2	2	8	-	12
Leather & Leather Products	-	1	8	68	-	77
Footwear	-	1	5	75	-	81
Wood Products	2	28	33	327	-	390
Furniture	13	20	16	286	5	340
Intermediate Industries						
Pulp & Paper	-	1	9	14	-	24
Chemicals & Chemical Pr.	1	2	8	26	-	37
Petroleum & Coal Products	-	-	1	5	-	6
Rubber & Rubber Products	-	4	3	29	-	36
Plastic Products	-	-	-	-	-	-
Non-Metallic Minerals & Pr.	13	18	78	470	6	565
Iron & Steel Industry	-	150	3,420	6,473	-	10,043
Non-Ferrous Metals (AL)	-	11	278	780	-	1,069
Mechanical Industries						
Metal Products	5	35	45	486	-	571
Machinery (excluding Elec.)	-	3	6	48	-	57
Machinery & Electric Equip.	-	1	4	15	-	20
Motor Vehicle & Transp. Equip.	-	12	9	67	-	88
Residual Group						
Graphic Arts	2	10	29	123	1	165
Others	2	3	1	29	-	35
Total	69	363	4,142	10,003	51	14,628

Source: Ministerio de Fomento, Direccion General de Estadistica y Censos Nacionales, V Encuesta Industrial, 1975, Resultados Regionales, Caracas, 1977.

TABLE 83

EMPLOYMENT IN THE VENEZUELAN ALUMINUM
INDUSTRY (ESTIMATES)

	<u>ALCASA</u>		<u>VENALUM</u>	
	Puerto Ordaz	Total	Puerto Ordaz	Total
1967	230	320		
1968		365		
1969		575		
1970		677		
1971	557	689		
1972		751		
1973		888		
1974	842	1,100		
1975	1,155	1,350		
1976	1,208	1,500		
1977	1,456	2,013		
1978		2,289	1,313	1,629
1979		2,400	1,864	2,239
1980	2,350	2,640	2,120	2,406

Source: 1. Questionnaires, 1980;
 2. CVG, Informes Anuales 1968 - 1978
 3. BCV, Informes Economicos, 1970 - 1978

increases in employment in Alcasa and Venalum were well ahead of the planned figures. According to the Vth National Plan Alcasa was supposed to provide employment to only 675 people in 1975, while the real employment was 1,350. The number of employees was further to increase to 1,090 in 1976, with the expected capacity of 115,000 mtpy, and remain at the same level during the period 1976-1980 (Table 70). In reality Alcasa's employment has almost doubled since 1975. A similar situation has existed in Venalum. It projected that with the planned capacity of 280,000 mtpy, the company would create 1,080 jobs while Venalum had already 1,629 employees in 1978.

It seems that the Venezuelan planners have not paid enough attention to the study of employment problems in the Guayana Region. The aluminum joint ventures were unable to control high rates of growth of their employment and labor movement from one employer to another. They have also suffered from the lack of skilled labor in the region.

In the 1970s both the gross production value per employee and the value added per employee in the aluminum industry were above the average level in the Venezuelan manufacturing sector if oil is excluded (Tables 84 & 85). However, a few traditional industries had higher values than aluminum, but this could be due to the changes in prices and the government policy to keep low prices in the country's basic industries. In the 1980s the aluminum industry should improve its relative position among other sectors and therefore generate even higher incomes in the region. Venalum's performance in 1980 seems to reflect such changes (see Table 81).

If the number of employees per output was used as a measure of

TABLE 84

GROSS PRODUCTION VALUE PER EMPLOYEE
(in Bolivars)

SECTORS	1971	1977
Traditional Industries	82,411	143,631
Food	104,160	255,043
Beverages	143,287	236,961
Tobacco	188,114	277,878
Textiles	61,863	104,103
Clothing	55,378	88,559
Leather & Leather Prod.	66,200	97,004
Footwear	38,705	65,734
Wood Products	45,227	88,971
Furniture	42,161	78,422
Intermediate Industries	144,137	344,261
Pulp & Paper	108,585	174,458
Chemicals & Chemical Pr.	91,882	168,495
Petroleum & Coal Products	879,601	1,760,262
Rubber & Rubber Products	87,504	133,127
Plastic Products	60,217	115,828
Non-Metallic Minerals & Pr.	61,236	73,599
Iron & Steel Industry	102,935	156,422
Non-Ferrous Metals (Al.)	100,674	171,897
Mechanical Industries	93,339	158,659
Metal Products	64,698	111,763
Machinery (excluding Elec.)	56,691	116,895
Machinery & Electric Equip.	90,126	124,385
Motor Vehicle & Transp. Ind.	140,751	281,592
Residual Group	55,637	87,619
Graphic Arts	56,773	103,910
Others	53,178	71,328
Total,	100,225	183,542

Source: calculations based on data from: 1. III Encuesta Industrial, CORDIPLAN, 1973.
2. VII Encuesta Industrial, OCEI, 1980.

TABLE 85

VALUE ADDED PER EMPLOYEE (in Bolivars)

SECTORS	1971	1977	α.
Traditional Industries	36,846	74,343	
Food	37,064	62,256	
Beverages	99,627	178,275	
Tobacco	55,022	184,286	
Textiles	34,191	58,120	
Clothing	28,297	36,219	
Leather & Leather Products	28,824	42,965	
Footwear	16,275	29,225	
Wood Products	20,397	43,671	
Furniture	20,948	34,071	
Intermediate Industries	55,431	204,727	
Pulp & Paper	51,332	85,710	
Chemicals & Chemical Pr.	54,565	98,913	
Petroleum & Coal Products	157,062	1,118,690	
Rubber & Rubber Products	47,724	63,257	
Plastic Products	30,571	61,671	
Non-metallic Minerals & Pr.	38,989	59,493	
Iron & Steel Industry	51,807	72,280	
Non-ferrous Metals (Al.)	52,343	77,802	
Mechanical Industries	42,350	64,721	
Metal Products	33,639	54,515	
Machinery (excluding Elec.)	31,183	69,435	
Machinery & Electric Equip.	45,331	55,662	
Motor Vehicle & Transp. Ind.	54,399	79,272	
Residual Group	31,515	61,560	
Graphic Arts	32,438	66,997	
Others	29,518	56,123	
Total	42,726	101,338	

Source: based on information 1. III Encuesta Industrial 1971, CORDIPLAN, 1973

2. VII Encuesta Industrial 1977, OCEI, 1980.

'economic efficiency' the Venezuelan joint ventures would probably be found to lag behind the producers from advanced countries. For example Alcan's smelters in Canada employ relatively less people than the Venezuelan joint ventures to produce 1 ton of primary aluminum:

at a wholly new site, 30 km from Jonquiere, the Grande Baie smelter now under construction will add 171,000 tonnes of capacity by 1982, and 700 new jobs. The Alma Smelter employs 675, and can produce 75,000 tonnes each year. Shawinigan and Beauharnois have 725 and 385 employees, respectively, and their production capacities are 83,000 and 46,000 tonnes ... the capacity of the Kitimat smelter is now 268,000 tonnes, and employees number 2,400 (Alcan Aluminum, 1980, pp. 8-9).

The interpretation of the above data has to be very cautious as it represents different conditions in two countries and different technologies.

Alcasa and Venalum have generated significant regional incomes through employment compensation. In 1971 earnings per employee in Alcasa's plant located in Puerto Ordaz (Ciudad Guayana) averaged Bs 26,250 (CVG, DEPI, 1978). This was higher than in the competing public enterprise Sidor and above the average national earnings in the manufacturing sector (Table 18). This tendency has been maintained throughout the 1970s and in 1980 it is estimated that Alcasa had to spend close to Bs 160,000,000 for payments to its employees. Venalum was to add another Bs 144,000,000 (Qs, 1980). In both companies the average wages were reported to be over Bs 60,000.

The employment and income generation by the joint ventures in the aluminum industry is the most important contribution to the regional development in Guayana. They also stimulate employment in other sectors. Edelca, for instance, had 1,810 employees in 1978. The exploitation of Vene-

zuelan bauxites will create new jobs and incomes in the region. Interalumina should add another 1,200 employees by 1983 (Qs, 1980).

Ciudad Guayana has benefited from the social programs that the aluminum industry has introduced. Both Alcasa and Venalum have their own housing programs. In 1978-79 Venalum offered 550 housing units for sale, while Alcasa was to provide 300 units. The employees who do not have adequate housing receive Bs 5 per day as a compensation from their employers. The deficit of housing remains one of the main problems in Ciudad Guayana and was estimated at 1,200 apartments for Alcasa's employees (Qs, 1980).

The two companies provide also other social services such as transportation for their employees, as Ciudad Guayana does not have an adequate public transportation system, medical care at the plant level and recreation activities, mainly sports. They also subsidize meals served at the companies' cafeterias. For example the cost of lunch is estimated at Bs 15, while an employee pays only Bs 3 (Qs, 1980).

On the other hand the examples from other countries tend to show that the MNCs operating in the aluminum industry and their subsidiaries do often offer more in terms of social infrastructure and services to their employees and generally to the regional economies than the Venezuelan joint ventures. The Demerara Bauxite Co., a former subsidiary of Alcan, built at Mackenzie Guyana a residential area with schools, hospital and housing for its workers, which was to benefit approximately 18,000 people in the Mackenzie - Wismar - Christianburg area of Guyana (Alcan, 1980). Similarly Aluisse built a self-contained township for 5,000 people at Gove, Australia

in support of its alumina plant project. The township has different housing units, buildings for local administration, as well as shipping and recreational facilities (Alusuisse, 1979).

Exports of Aluminum

Exports of aluminum have been vital for the expansion of the Venezuelan joint ventures as the local market has been too small to absorb the national production of primary aluminum.

Alcasa initiated its exports in 1968 with 1,380 mt of aluminum sold to Colombia and 3,120.6 mt to the U.S., Canada and Argentina (CVG, 1969 & 1970). Foreign sales have experienced serious fluctuations since 1968. They were at the lowest level in 1972 with only 8,799 mt of aluminum and aluminum products exported (Table 86) and reached their peak in 1978/79 with 50,824.2 mt sold to other countries. Though Latin American countries have remained the main customers of Alcasa's aluminum, there have also been changes in the company's export destinations. In 1979/80 Latin America accounted for 50% of the total Alcasa's exports as it bought 23,750.6 mt of aluminum (Table 87). Europe has become an important customer with 29% of the total Alcasa's foreign sales and the Far East with 19%.

Venalum's export structure has been more stable because of the long term contract with the Japanese companies which buy its aluminum. In 1979/80 exports to Japan constituted 55% of the total sales (national and foreign) by Venalum, for an estimated value of Bs. 790,000,000 or US

TABLE 86

EXPORTS AND IMPORTS OF ALUMINUM
& ALUMINUM PRODUCTS

	1970	1971	1972	1973	1974	1975	1976	1977
Exports (MT)	11,765	11,106	8,799	10,884	15,334	10,581	16,211	9,601
Index	100	94	75	93	130	90	138	82
Exports (in Bs - thousands)	33,529	31,758	24,645	26,799	60,511	44,329	71,205	47,948
Index	100	95	74	80	180	132	212	143
Imports (MT)	2,710	3,435	3,414	7,197	5,865	8,672	13,701	66,944
Index	100	127	126	266	216	320	506	2,470
Imports (in Bs - thousands)	15,644	17,635	17,692	30,461	37,059	50,890	102,856	442,550
Index	100	113	113	195	237	325	657	2,828

Source: Calculations based on data from Dirección General de Estadística y Censos Nacionales, Estadísticas del Comercio Exterior de Venezuela, Resúmenes Anuales 1970, ... 1977. (1976 & 1977 - OCEI).

TABLE 87

EXPORTS OF ALUMINUM (ALCASA)

Anos	1977/78		1979/80	
	11977/78	1978/79	1978/79	1979/80
	mt	mt	mt	mt
Latin America	12,265.8	23,603.4	23,750.6	
Far East	1,999.9	11,716.2	8,697.5	
U.S.A.	6,829.7	13,505.5	999.8	
Europe		1,999.1	13,760.5	
Total	21,095.4*	50,824.2	47,208.4	

Source: Qs, 1980.

\$ 183,655,000 (Qs, 1980). Prices for aluminum have been based on Alcan's international price for ingot at the time the transactions took place. The industry has benefited from the government export promotion policies through 'export incentives' established at 16% for aluminum exports (Table 88 & Qs, 1980).

The aluminum joint ventures have been more successful than other producers in expanding their foreign sales. They have managed to surpass significantly the planned 'potential' exports of aluminum for 1980 (Table 89) while the iron & steel industry had serious problems even in maintaining its export levels (Table 90). Instead of becoming the main exporter of non-traditional products Sidor's position has deteriorated so badly that in 1975 the public enterprise exported only 812 mt of products for a total value of Bs 3,368,000 or US \$ 783,256. The foreign sales have recovered in recent years but they are still far behind the planned export levels.

Despite the rapid growth of the Venezuelan aluminum industry the country's demand for aluminum products has grown even faster and this has increased Venezuela's dependence on importation. The imports of aluminum products have gone up drastically since 1968 and in 1977 Venezuela had to import 66,944 mt of aluminum and aluminum products for a total value of Bs 442,549,513 (OCEI, 1979, p. 887) or US \$102,918,490. In the same year exports of aluminum and aluminum products earned only Bs 47,947,514 or US \$ 11,150,584 (OCEI, 1979, p. 91). This situation has changed in recent years with the new exports from Venalum and Alcasa. It should improve further when the fabrication capacity of Alcasa is expanded and new units are added in Venalum.

TABLE 88

EXPORT INCENTIVES IN VENEZUELA

National Value Added %	Credit Incentives based on f.o.b. prices
30 - 44.9	11%
45 - 59.9	16%
60 - 69.9	20%
70 - 79.9	23%
80 - 89.9	26%
90 - 99.9	29%
100 -	30%

Source: Fondo de Financiamiento de la Exportaciones, Ley de Incentivo a la Exportacion (Decree Law 4/09/1973), Instituto del Comercio Exterior & Ministerio de Hacienda (Caracas, 1980).




TABLE 89

THE PRINCIPAL PRODUCTION & EXPORT GOALS FOR 1980

	Firm		Potential	
	Production	Exports	Production	Exports
	Thousands of Metric Tons			
Iron ore	27,000	2,300	40,000	9,000
Enriched iron ore	10,000	10,000	12,000	12,000
Sponge iron	4,100	4,100	4,100	4,100
Steel	4,000	-	6,600	2,500
Aluminum	21	-	86	25
Pulp and paper	50	-	130	-
Ammonia	-	-	330	330
	Millions of Bolivars			
Metal fabrications	52	-	420	50

@ "firm" targets are based on projects already in an advanced stage of development, "potential" targets include those projects that reflect the needs of the nation for more ambitious goals, projects that have been seriously studied and considered to be feasible and desirable but are presently at a preliminary stage of promotion and development (Alamo Blanco, 1969, p. 67)

(Source: CVG, 1966, Chart V-5, p. 19; Alamo Blanco & Ganz, 1969, p. 67).

TABLE 90

IRON & STEEL INDUSTRY: EXPORTS (IN MT & BS TH)

PRODUCTS	1970		1971		1972		1973		1974		1975		1976		1977	
	MT	Bs	MT	Bs	MT	Bs	MT	Bs	MT	Bs	MT	Bs	MT	Bs	MT	Bs
Cast-Iron	698	250	300	69	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Manufactured	170,204	56,615	84,076	32,035	243,378	85,365	203,427	96,065	55,069	34,594	-	-	-	-	13,900	7,891
Mouldings	1,194	511	298	120	31	22	16,146	13,991	31	83	30	53	35	63	21	36
Bars & Rods	4,196	2,963	1,062	722	315	203	502	375	169	212	8	14	3	5	-	-
Steel Pipes	10,079	4,427	1,109	1,038	1,927	1,812	7,617	7,013	578	1,146	709	2,807	4,516	12,675	7,477	13,258
Iron Pipes	-	-	-	-	-	-	-	-	45	67	65	125	-	-	-	-
Sheet (thick)	-	-	-	-	-	-	-	-	-	-	-	-	4,070	2,276	-	-
Hot-Rolled Coils	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,500	1,344
Tin-Plate & Sheet	-	-	-	-	-	-	-	-	-	-	-	-	17,023	18,928	16,656	20,222
Others	16	102	-	-	33	5,040	8	4	-	-	-	369	-	369	-	-
Total	186,387	64,868	86,845	34,017	250,691	87,410	227,692	117,448	55,892	36,102	812	3,368	25,667	34,316	40,554	42,751
Index (1970 = 100)	100	100	47	52	134	135	122	181	30	56	0.4	5	14	53	21	66

Source: based on information from: 1. Estadísticas de la Región Guayana, DEPI-CVC, Diciembre 1978.

2. CVC Siderurgica del Orinoco, (SIDOR), 1980

3. CVC, DEPI & DDI, 1980.

Conclusion :

Expansion of Economic Spaces

The accelerated growth of the aluminum industry signifies that important gains in the economic role and spaces of the Venezuelan joint ventures have taken place. The industry has grown at much higher rates than other manufacturing sectors in Guayana, particularly compared to the iron and steel industry. Adding to its domestic impact has been the initiation and establishment of backward and forward linkages with the regional and national economies. There are thought to be good prospects for their expansion in future. Both the alumina plant and local bauxites should strengthen the comparative advantage of Venezuela in aluminum smelting. The success of the private joint venture Sural should encourage other producers of finished and semi-finished aluminum products to locate in Guayana. The growing demand for electric energy from the aluminum smelters supports further development of hydro-power installations in the Guayana region.

The aluminum joint ventures have generated important employment and income effects crucial for the growth of the regional economy and development of tertiary activities in the new city. The aluminum producers continue to be the second largest employer in the region. On the other hand their social contribution to this frontier community has been less impressive as they have been unable to significantly improve the standard of living of their employees and the housing situation in Guayana remains somewhat deplorable.

The growth of exports also suggests there has been an important expansion in the economic spaces of the Venezuelan joint ventures, with foreign markets becoming the major consumers of the Venezuelan aluminum. However, export prices have, as in many other countries remained subsidized by the government and joint ventures' policies. Such subsidies, if continued and extended may eventually promote yet another inefficient industry.

Technology Choices and Transfer of Knowledge

The development of local technological capacities has been of secondary importance to the Venezuelan planners and decision makers who promoted the accelerated growth of the country's aluminum industry. As a consequence the transfer of technology in the aluminum industry and especially 'absorption', 'assimilation' and 'adaptation' of foreign knowledge have been at least problematical.

ALCASA

For the first aluminum smelter in Guayana, Reynolds' technology was chosen over other options. The main factors behind the Venezuelan decision were minimization of production costs, maximization of output and most efficient use of regional resources. The Venezuelan partner had confidence in the well-known MNC and its technology. Also the contract conditions appeared to be more attractive than the competitive offers from other companies (Qs, 1980). Reynolds has argued that the most important factor in the choice of production techniques for Alcasa was the efficient use of available local resources, labor, capital and energy. It has suggested that the aluminum industry in general requires use of certain technologies which are independent from local conditions in a given country.

Alcasa's technology was acquired basically without any modifications or adaptations. Later Reynolds has introduced a few changes but

they are based upon progress made by its subsidiaries and research centers elsewhere. Those changes have involved reduction in input requirements and helped to improve the smelter's productivity (Table 91).

Alcasa is equipped with 468 electrolytic cells (1980) and uses the pre-baked anodes. Its most recent expansion was based on technology copied from Reynolds' smelter in Hamburg, West Germany. For the capacity of 120,000 mtpy of primary aluminum Alcasa needs the following inputs:

alumina	-	240,000 mtpy
coke	-	55,000 mtpy
cryolite	-	2,300 mtpy
aluminum fluoride	-	2,300 mtpy (Qs, 1980) (Fig. 13).

Though Reynolds has pointed out its significant role in transfer of technology to Venezuela, its real contribution in the aluminum industry is questionable. Reynolds has registered several patents in Venezuela related to aluminum smelting, semi-fabrication and fabrication, but they have hardly contributed to any real transfer of knowledge to the local partners. The smelter has continued to be managed by Reynolds' specialists and after almost 14 years of operations there is still lack of highly skilled Venezuelans who could take over main responsibilities from the MNC. Reynolds has complained that many of those who have received costly training have moved to other jobs.

Alcasa has been unable to promote the development of local R & D capabilities but it has managed to stimulate the limited transfer of

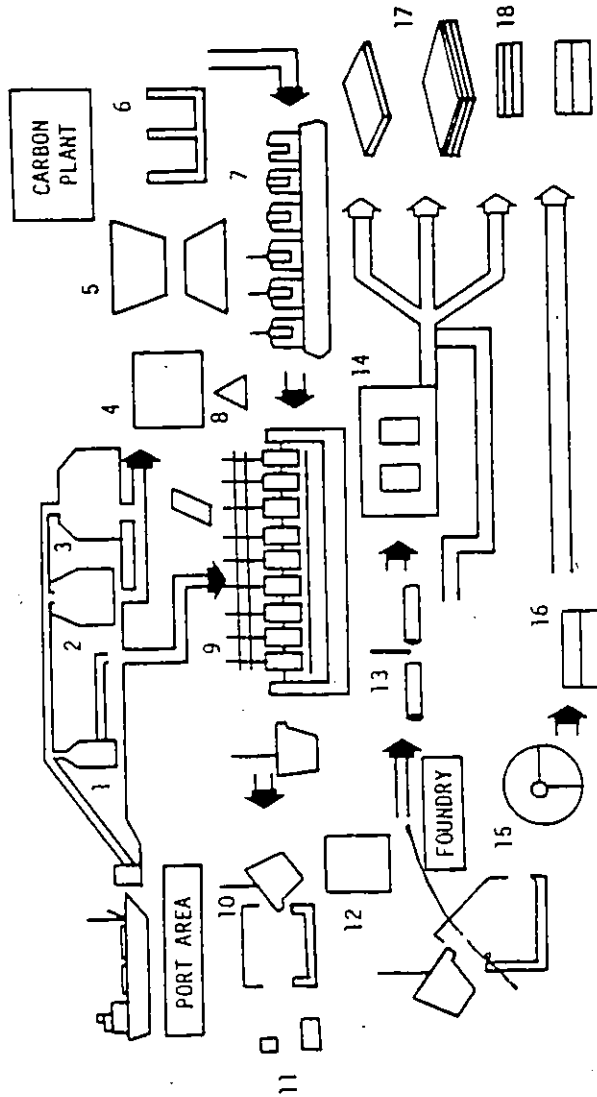
TABLE 91

BASIC MATERIALS CONSUMPTION FOR THE
REYNOLDS LOW DENSITY REDUCTION CELLS

1. ALCASA - Phases I, II and III	Units per units of metal
Alumina	1.96
Coke	0.47
H.S.P. Pitch	0.12
Aluminum Fluoride	0.031
Cryolite	0.029
Lithium Carbonate	0.0025
Magnesium Oxide	0.0012
Calcined Anthracite Coal	0.80 MT/pot
L.S.P. Pitch	590 K/pot
2. ALCASA - Phase IV and VENALUM	
Alumina (includes 2% unloading loss)	1.96
Coke	0.42
H.S.P. Pitch	0.10
Aluminum Fluoride	0.015
Cryolite	0.022
Lithum Carbonate	0.002
Magnesium Oxide	0.002
Foundry Coke (Packing Material)	30 Kg/Mt. of baked anodes
Calcined Anthracite Coal	12 MT/pot
L.S.P. Pitch	1.56 MT/pot
Power	15.4 kWh/kg

Source: Qs, 1980.

Figure 13 : Flow-Sheet for Aluminum Smelting (Alcasa & Venalum)



- | | | |
|-------------------|------------------------|----------------------------|
| 1. Alumina | 7. Anode Assembly | 13. Saw |
| 2. Coke | 8. Energy | 14. Homogenization Furnace |
| 3. Pitch | 9. Electrolytic Cells | 15. Ingot Casting |
| 4. Mixer | 10. Holding Oven | 16. Ingot |
| 5. Press | 11. Pig & Metal Alloys | 17. Plate & Sheet |
| 6. Baking Furnace | 12. Cold Casting | 18. Rod & Bar |

Source : Qs, 1980 (Alcasa).

technology and the assimilation and absorption of foreign knowledge. The main Alcasa's or rather Reynolds' contribution has been through training programs for the company's employees who had no previous experience nor tradition in aluminum smelting. Alcasa has also a small plant laboratory which employs 32 people with only 2 foreign experts and although its main function is quality control, it does have contacts with R & D centers in other countries and its activities include product and method adaptation to market conditions. It remains true in the aluminum industry that only large scale operations justify creation of R & D centers. All big MNCs have only a few R & D centers and the scale of their operations could not be compared to that of Alcasa. Reynolds has all its four research centers located in the U.S., with only one R & D center for aluminum reduction in Listerhill, Alabama (Table 52).

VENALUM

The difficult situation of the Venezuelan decision-makers in stimulating transfer of technology has been evident in the case of Venalum. First of all the government has been unable to implement regulations and technological policies recommended by the Andean Pact. SIEEX has lacked experience to make the necessary assessments of technology imports for the aluminum industry which was on a priority list among the government's investment projects. The evaluations of technology by the CVG and the FIV have been based on comparative conditions existing in other countries rather

than local needs as the Venezuelan planners were only interested in the most modern Western technologies.

The choice of technology for Venalum was determined by factors similar to those in the case of Alcasa. These included minimization of the production costs, maximization of output and most efficient use of local resources (Qs, 1980). Initially a Japanese company was to supply technology for the new smelter but Venezuelans seemed to be afraid of taking risks with the 'unknown' partner. The final decision was to revert to Reynolds' technology. This has complicated Venalum's situation as Reynolds was not one of the many partners to the venture.

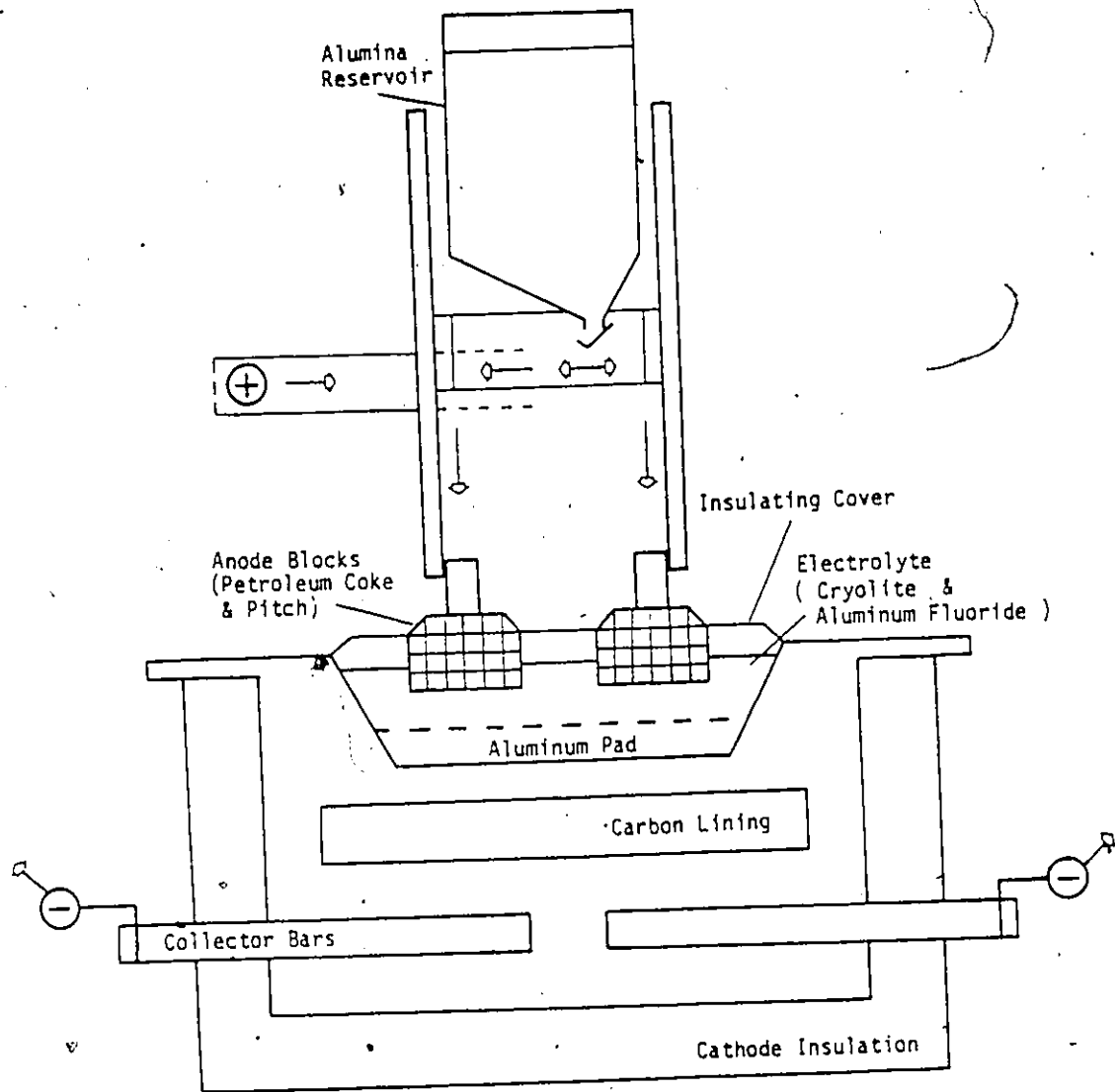
Venalum is using the same process as Alcasa's phase IV. The smelter is equipped with 720 electrolytic cells and follows the Reynolds' design, the so called 'Niagara' cell (Figure 14). For the projected production of 280,000 mtpy of aluminum, the company will require the following inputs:

alumina	-	560,000 mtpy;
coke	-	130,000 mtpy
cryolite	-	5,500 mtpy
aluminum fluoride	-	5,500 mtpy (Qs, 1980).

Venalum has had to sign a separate contract with Reynolds for the management of the new smelter as the country could not provide highly skilled labor.

It seems that Venalum will not contribute either to the more substantial transfer of technology unless some more interest is shown

Figure 14 : Cross-Section of the Reynolds' "Niagara" Cell (Hamburg Pot) Fitted with Pre-Baked Anodes



Source : Qs, 1980, (Venalum).

by Venezuelans to develop their own S & T basis. If Venalum follows the example set by Alcasa, Venezuelans will only be using foreign technology and the real transfer of knowledge will be very slow.

Recently the CVG's officials have expressed some support for the creation of a Venezuelan research institute for the aluminum industry, CITAL (Qs, 1980). Venalum has a very modern plant laboratory but its functions are limited almost exclusively to quality control. It is possible that in future some market research will be added. The company has also started training programs for its employees which last from two weeks to two months and have an average attendance of 100 persons per month (AVADAL Qs, 1980). Venalum plans to expand its training courses and include management and administration staff.

INTERALUMINA

The creation of another joint venture in Ciudad Guayana for the production of alumina follows the by now almost 'traditional' pattern of decision-making. The Venezuelan partners have claimed that the choice of technology for Interalumina has been made on the criterion of cost minimization, which would assure efficient production. Venezuelans were also interested in the minimization rather than the maximization of employment numbers. (Qs, 1980).

Similarly to other projects the decision has been based upon a study of recent alumina projects in advanced countries. Alusuisse was chosen

because it could offer what was perceived as the most modern technology. As a result Interalumina will be an almost exact replica of the Gove alumina plant, designed and built in Australia by Swiss Aluminum Ltd. Alusuisse's Gove project had strong 'demonstration effects' which have additionally appealed to the Venezuelan planners, but it is doubtful that its technological contribution will be any different from the two aluminum joint ventures. Alusuisse has also prepared feasibility studies for the Venezuelan bauxite resources, while the Venezuelan Institute of Geology has continued its own 'independent' research.

BAUXIVEN

Bauxiven will most likely follow the experience of the aluminum joint ventures as Venezuelan decision makers are determined to rely on modern 'efficient' technology from advanced countries. Alusuisse may have more chances, than other MNCs, to get involved in the development of bauxite mining in the region of Los Pijiguaos, because of its previous cooperation with the Venezuelan partner.

On the other hand there is still some hope that local R & D centers will participate more in the bauxite project than was the case with the aluminum smelters, as local capacities appear much stronger in the former field (Qs, 1980).

Conclusion :

Contribution to Creation of Local S & T Capacities

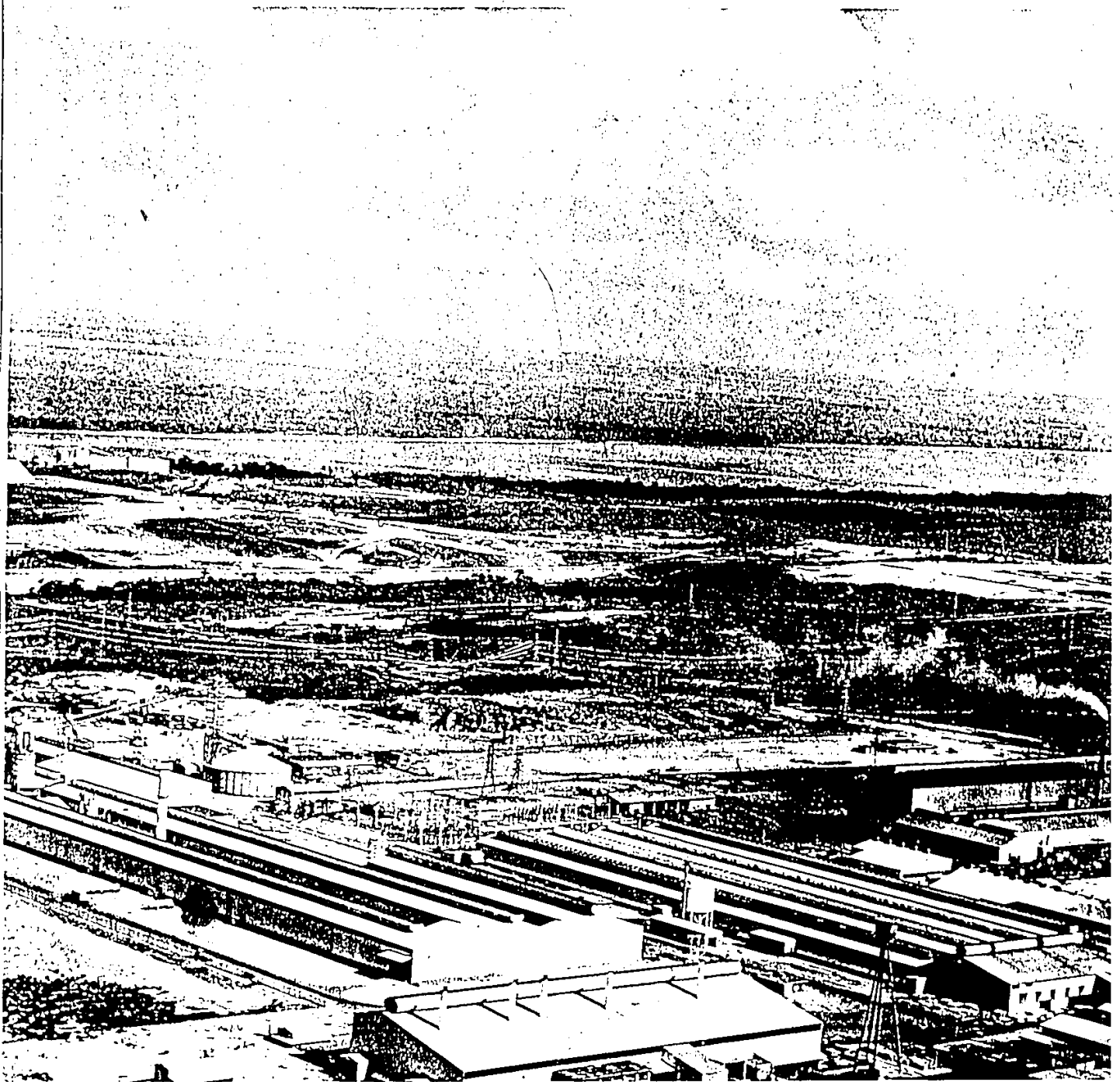
The role of the joint ventures in technology transfer at first sight leaves much to be desired. First, the foreign knowledge has been transferred with little apparent effort to adapt it to local conditions. The Venezuelan smelters are virtually the exact replicas of the similar installations in the advanced countries. And though it could be argued that the aluminum industry uses 'standard technologies' there always exists choice of different processes and some room for local adaptations. Second, whereas several training programs were introduced as the country had had no previous experience in aluminum smelting, there is still a serious lack of suitably skilled labour. Third, management of the smelters remains in the hands of the MNC with no sign that important functions could be transferred to the local partners in the nearest future. Fourth, the joint ventures have not encouraged the creation of a local R & D center for the aluminum industry. The main research efforts have been concentrated in the parent companies of the foreign partners. The Venezuelan role in R & D has been restricted to the plant laboratories which are mainly responsible for the quality control. Again one could argue that even the six leading MNCs in the world's aluminum industry do not entirely depend on their own technological capacities and their own R & D centers, as use of other MNCs' expertise and techniques becomes more popular. This is however no excuse for the Venezuelan total dependence on outside research.

The Venezuelan experience shows the difference between the use of foreign expertise and services and the transfer of technology. The former does not require the participation of local partners and local R & D centers and its contribution to the creation of the country's S & T capacities is also minimal. If the MNCs are blamed for this situation, so should be the local partners. Both the CVG and FIV have shown a lack of interest in technology problems and in development of the local S & T basis for the aluminum industry. They have been mainly preoccupied with accelerated economic growth at the lowest possible costs. There has been even more pressure upon 'purely' economic efficiency since the FIV became an important partner to the ventures (Qs, 1980). Neither have other government agencies been able to influence technology decisions in the aluminum industry. SIEX had not enough power to implement the regulations recommended by Decision 85 (see Chapter IV), which had no effect upon the actual imports of technology by the aluminum industry.

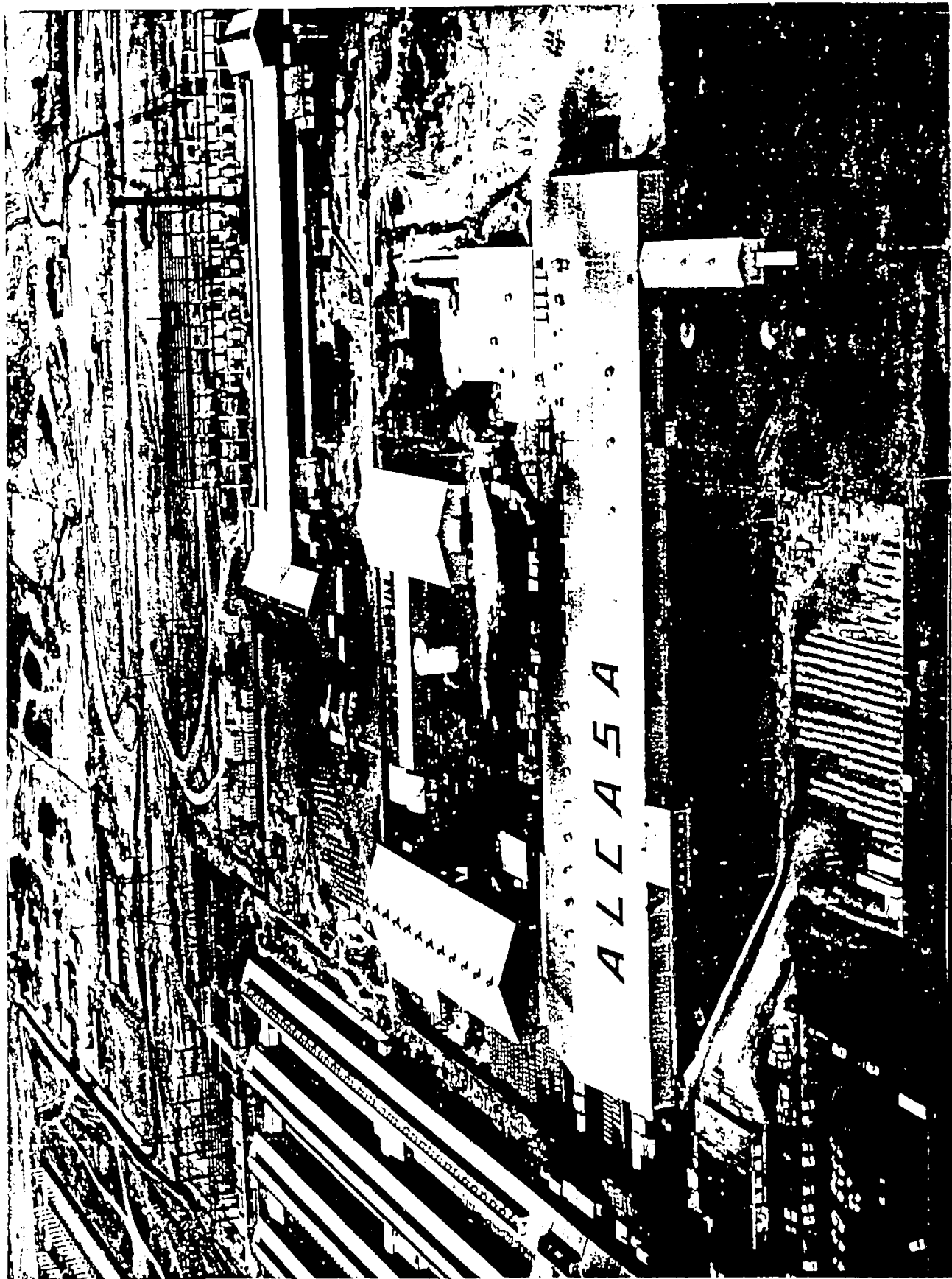
Venezuela's current technology policy, as opposed to practice does not appear realistic. It is doubtful that the country will be able to make any progress in the field of technology if it does not devote more attention to the 'absorption', 'assimilation' and 'adaptation' of imported knowledge first. Only then any innovations from the local R & D centers could be expected.

Picture 4 : Alcase.

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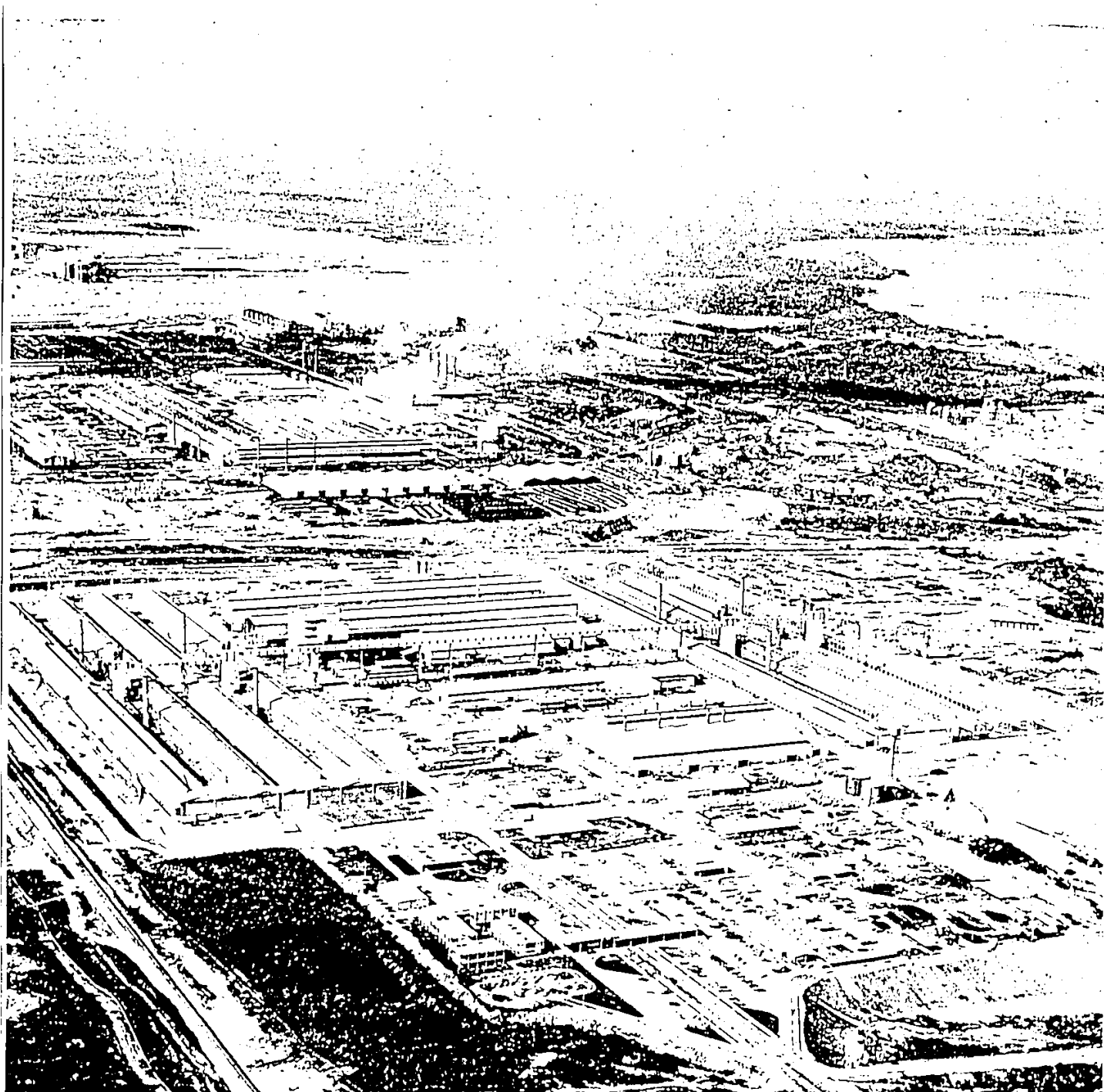


Picture 5 : Alcasa

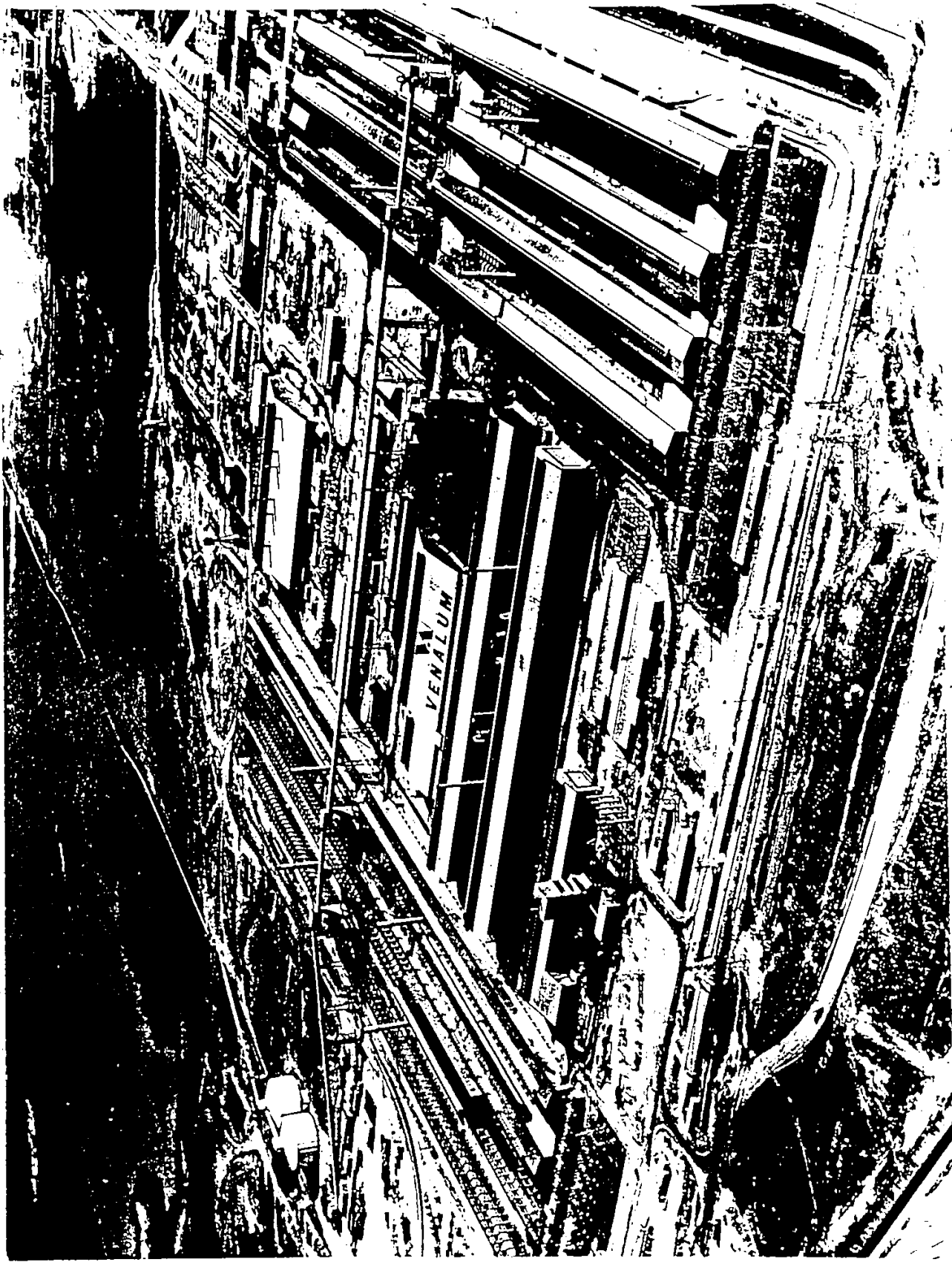


Picture 6 : Venalum

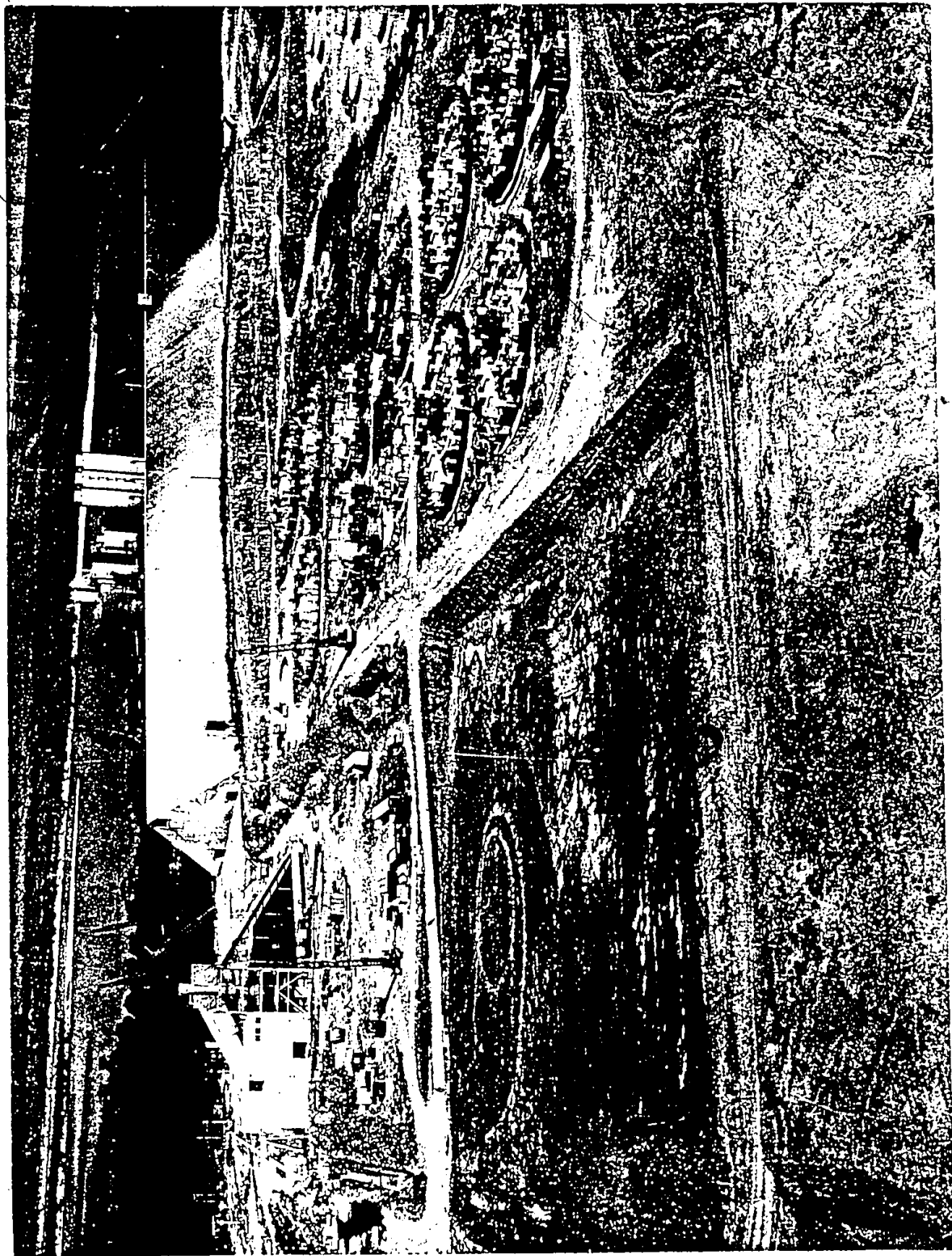
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Picture 7 : Venalum /

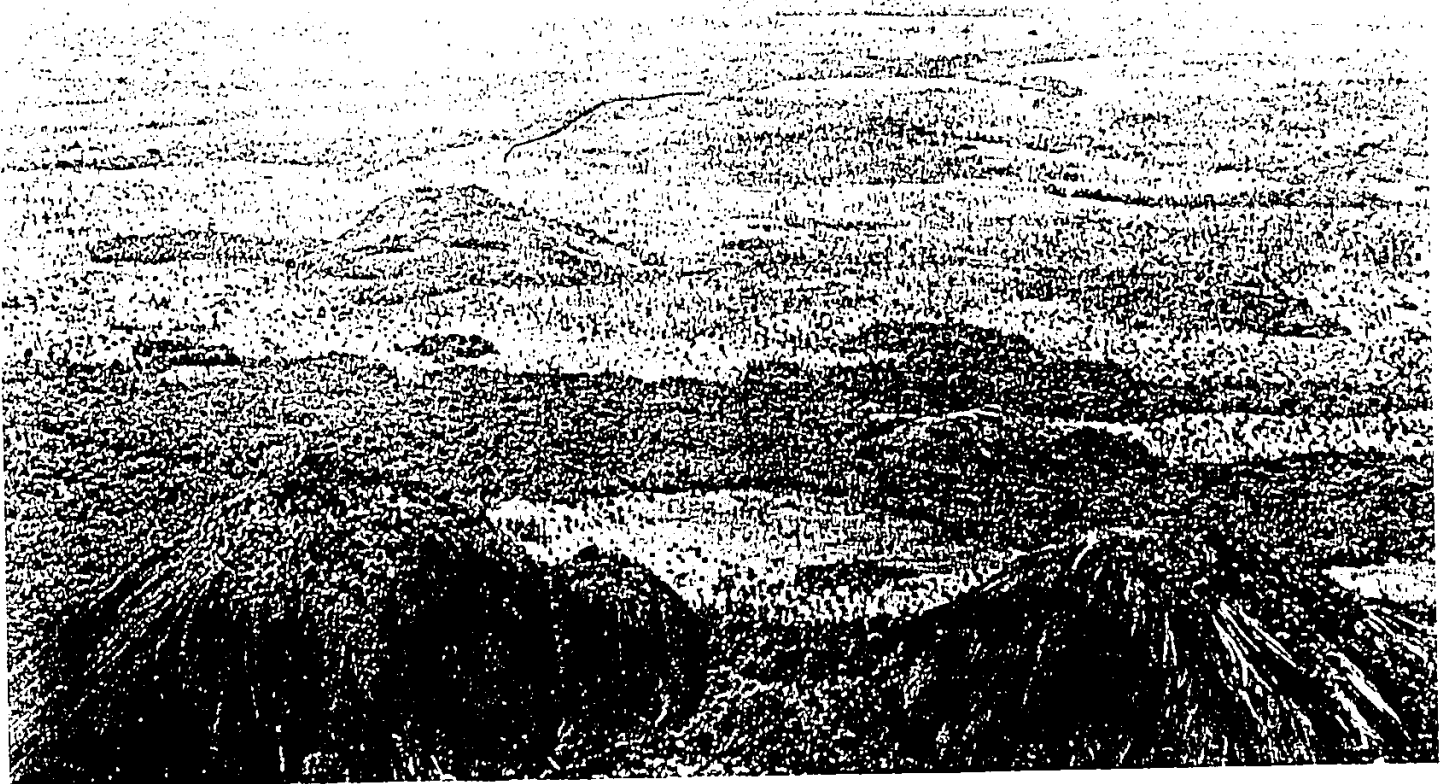


Picture 8 : Interlumina (Construction Stage)



Picture 9 : Los Pijiguaos

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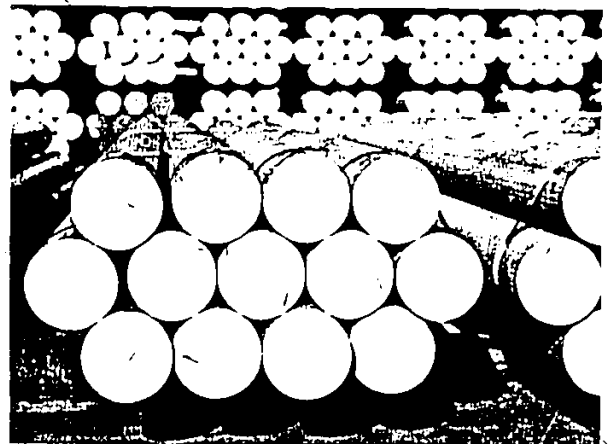
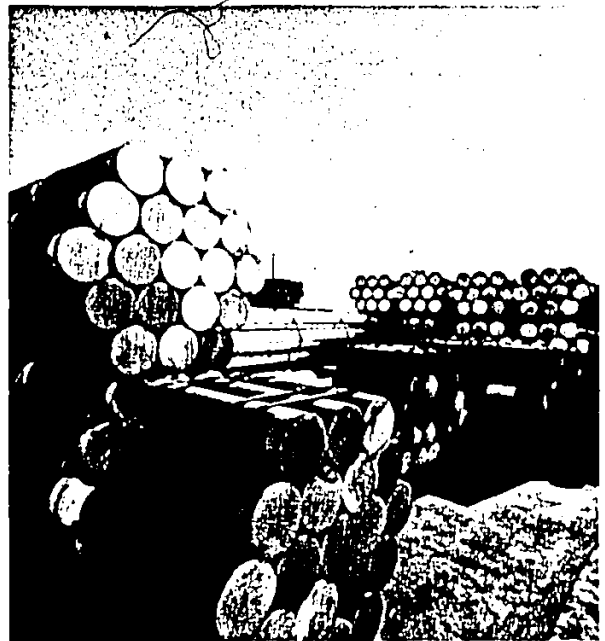
Picture 9: Bauxite Rock, Los Piliguas

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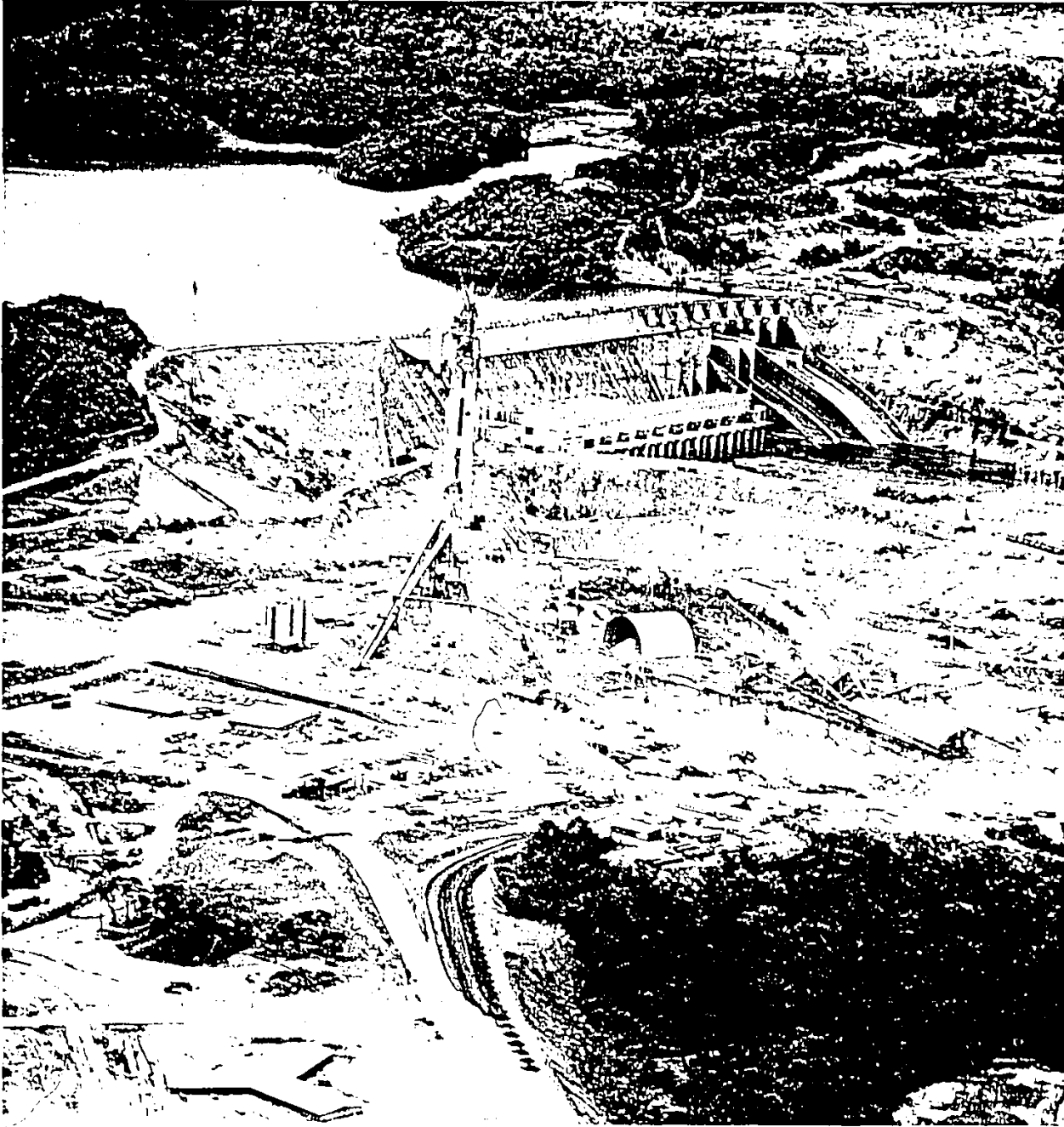
Picture 10 : Aluminum (Alcasa)

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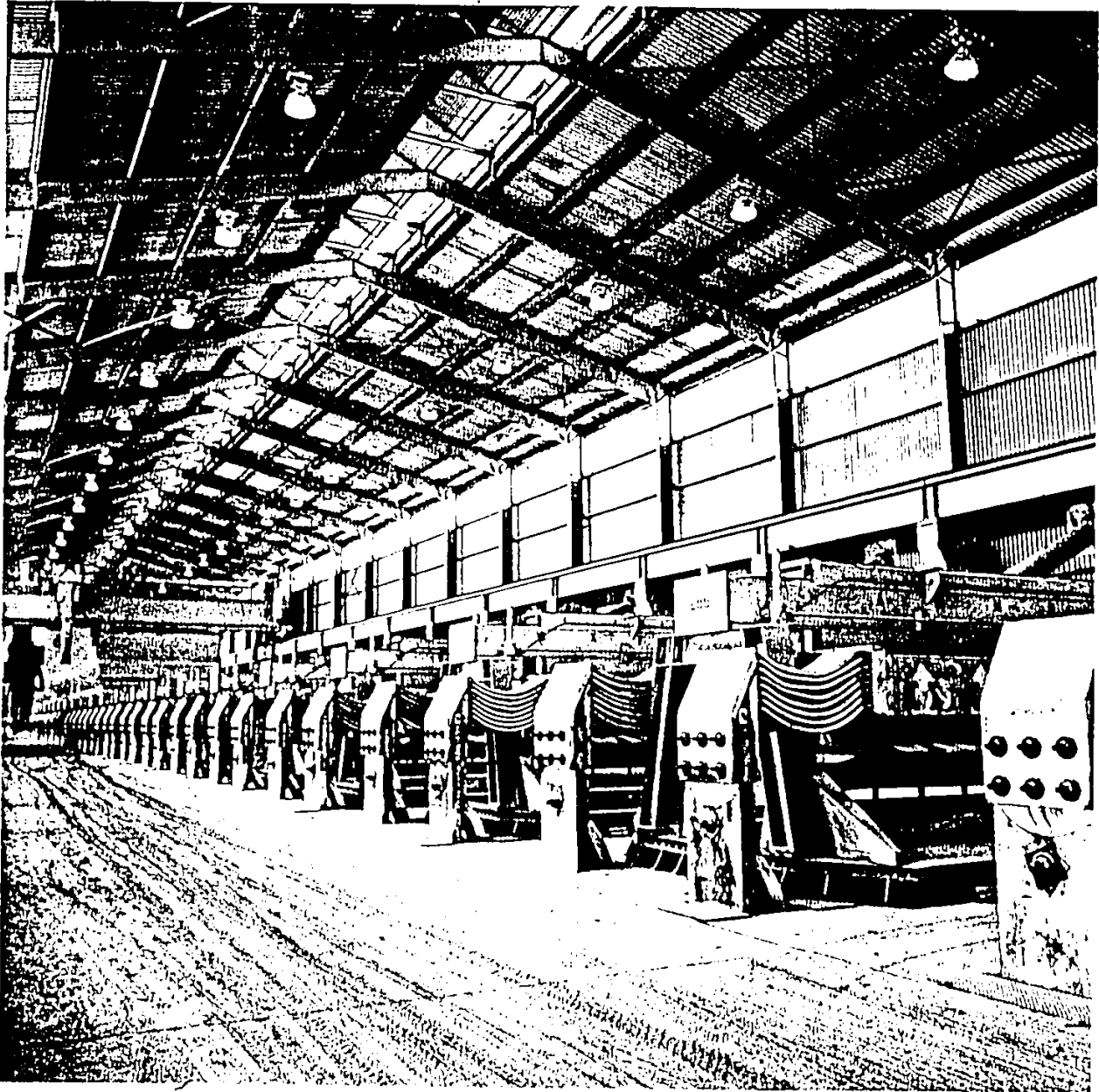
Picture 11 : Guri Dam (Construction Stage)

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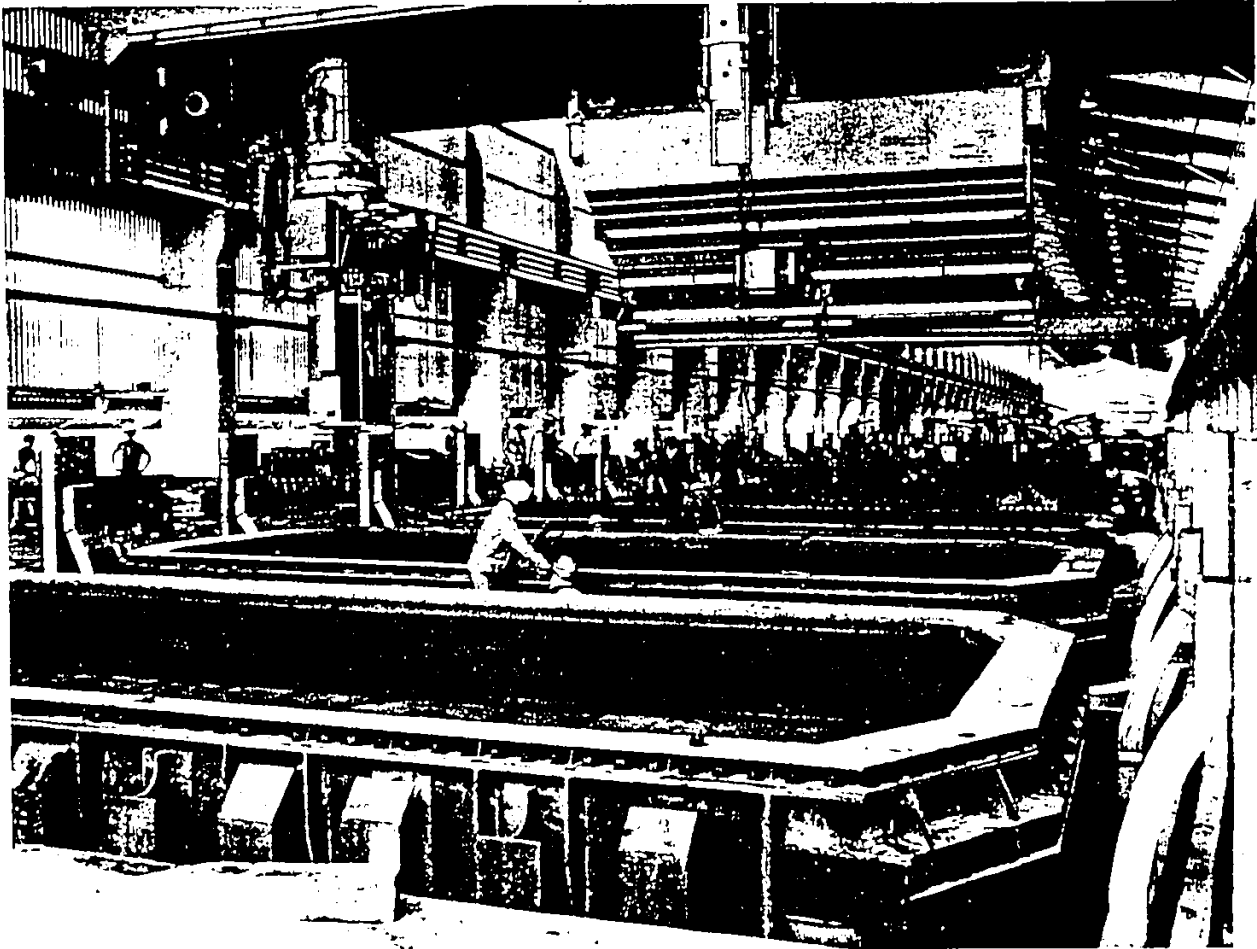


Picture 12 : Alcasa, Pot Line

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Picture 13 : Venalum, Potline (Installation)



CHAPTER VII

FINAL COMMENTS

Limits of the Study

Most research that deals with problems of developing countries is subject to numerous difficulties and serious limitations. This thesis is no exception. First, there has been a lack of adequate and reliable information and statistics. The survey-questionnaire and interviews attempted to fill some gaps between what was needed and what was available. Second, it was initially desired to compare the performance of aluminum joint ventures not only with the conditions set for development agents by the theoretical approach but also with the behavior of subsidiaries of MNCs. However, this could be done only to a limited extent. The changing Venezuelan political climate as in many developing countries and particularly in those belonging to the Andean Pact no longer allows direct foreign investments in the form of wholly owned subsidiaries of foreign companies. Third, the study had to adopt some simplified assumptions. One such assumption was that the government adequately represented national and regional interests, certainly an assumption which may be questioned by more radical theorists. On the other hand one has to remember that Venezuela enjoys a more democratic

system than the majority of developing countries. Fourth, it could also be argued that it is still too early to fully evaluate the performance of the Venezuelan development agents. While this may be partly true, it should not be treated as an excuse for postponing studies in those areas which are crucial for improving our understanding of regional development.

And finally, this thesis obviously reflects a compromise between the desire for academic perfection, practical resource and other constraints and the author's competence.

Concluding Comments

It seems obvious that further research is needed to validate a synchronized growth strategy as the case studies were limited to only one industry and country. Future investigation will have to include other sectors of the economy and also different national socio-economic environments. Though Venezuela appears to offer favorable conditions for the application of our approach, the situation in other countries may be less encouraging. Nevertheless, some concluding comments are warranted.

One value of relating the concepts of synchronized growth with the Venezuelan setting lies in revealing some weaknesses of theoretical concepts and suggesting possible ways for their redefinition and adaptation to a concrete environment. The thesis also shows Venezuela's steps to stimulate regional development. The evaluation of the performance of the selected development actors explains to what extent the theoretical conditions defined for development agents were satisfied in practice. The more detailed examination of the role of the aluminum joint ventures in regional growth should point out some advantages and disadvantages of the industrial cooperation between government agencies and MNCs.

An area which needs closer scrutiny involves the identification of regional versus national interest. The central government may not readily represent in optimal fashion both regional and national interests. In future studies the perspective and role of new partners, such as regional agencies and trade unions, must also be examined.

Venezuela has already made some progress towards 'synchronized growth'. It has created ~~new~~ development agents, as well as a new 'growth center' in the periphery and promoted synchronization processes on a limited scale. The creation of potential development agents has not always been a result of coordination efforts and increased cooperation between different partners in the manner suggested by the theory. The Venezuelan case shows that new development agents may be imposed upon the existing institutional framework by an outside intervention and even against some interests of the established institutions. This may be partly explained by the lack of private initiative in the less developed regions. The creation of a new development agent comes then as a 'disturbance' to the prevailing structures. Such was the situation with the emergence of the Venezuelan Investment Fund (FIV) and partly also with the Guayana Development Agency (CVG) itself. However, after introducing a new institution, there has been even greater need for harmonization of interests and actions to minimize the negative effects of such 'disturbance' and to limit or avoid confrontation and tensions between the new and old partners.

The new development agents in Venezuela have been programmed more within economic than strictly geographic spaces. The national goals have been as pronounced as the regional ones. Perhaps this was the key to the major support of a new program by Caracas. The new dimension has also given ~~to~~ regional actors more 'geographical flexibility', as the region's boundaries had to be constantly enlarged to accommodate new industrial projects. The Guayana development programme is readily seen in the perspective of

Hirschman's thesis that economic growth is necessarily unbalanced. Indeed imbalances created by the CVG have acted partly as 'motive' powers for further investments in the region.

The CVG has managed to implement several large industrial projects but it has been less able to stimulate synchronization processes, particularly with other development actors. The lack of more substantial cooperation has hampered the execution of social programmes, mainly housing. The Agency has been unable on its own to significantly improve the quality of life of the local population. Thus the creation of a new development agent may not always assure the required degree of cooperation with other regional actors. Synchronization processes may have more chances when backed by other government policies. There has been for example little sign of 'good will' or willingness to operate in unison on the part of almost all development actors in Venezuela, except in those cases when synchronization was institutionalized.

While the theoretical approach may indicate the need for more direct forms of government involvement, it does not justify excessive government intervention and a paternalistic role particularly in those areas which are successfully operated by private capital or public-private ventures. Indeed, quite the opposite. In countries which do not have as vast capital resources as Venezuela does, the main role in regional development may best be played by private local- and foreign capital.

The Venezuelan experience further suggests that not all the conditions defined for development agents have to be satisfied in order to

assure rapid expansion of the economic role and spaces of the new institutions and the accelerated growth of the regional economy in the short run. For example the technology aspects do not appear to be as important as claimed by the theory in the initial stages of regional development. In Venezuela, the expansion of economic spaces of the development agents has been almost solely based upon foreign know-how. The participation of local science and technology has been minimal.

The CVG's experience also indicates that development agents may have a limited duration of dynamic performance, as new institutions evolve with changing conditions and take over the leading role in development. The direct role of the CVG will most likely further diminish as new development agents have already emerged and significantly increased their contribution to regional growth. The most important new agents are the Venezuelan Investment Fund and the CVG's subsidiaries and joint ventures with foreign capital.

The case study of the aluminum industry should be treated as a particular situation rather than generally representative of the manufacturing sector. While joint ventures may offer many advantages to developing countries wishing to build their own aluminum smelters or perhaps large scale capital-intensive industries, other forms of business organization may be found more attractive for other manufacturing projects. Nevertheless, the results of this thesis may have somewhat broader implications and may be found useful for future regional development studies and programmes.

The Venezuelan joint ventures seem to have satisfied several

of the conditions specified for development agents, though their operations have not been easily synchronized. One of the main obstacles was the Venezuelan government's continuous pressures to reduce foreign participation and increase the share of local public capital. The government intervention has led to frequent shifts in ownership and changes in expansion policies which have threatened if not undermined the joint ventures' stability. The insistence on a large number of partners by the Venezuelan officials has tended to complicate the harmonization of interests and actions between all sides to the venture. The recent evolution of the aluminum industry suggests that excessive government intervention, guided by 'ruling ideologies' or political aspirations, may ultimately undermine or wipe out any positive effects of international industrial cooperation. Equity and majority shares by the Venezuelan partners have not assured equal participation in decision making, though they have reduced the Venezuelan fear of 'dependency'. The unequal share of functions has been due not only to the lack of skilled labor in Venezuela, but also to the relatively weak negotiating position of the local partner.

Perhaps the rather slow progress in promoting synchronization processes by the Venezuelan joint ventures was partly due to the lack of experience in the field of industrial cooperation by the Venezuelans. In future with the experience gained this situation might change radically. The lack of stability of the Venezuelan ventures has prevented foreign companies from increasing their willingness to get involved in more sophisticated forms of mutual coordination of interests and actions.

The feeling of being in a defensive position certainly does not favor the disposition towards synchronization processes.

The most impressive achievement of the Venezuelan aluminum ventures has been in the field of economic expansion, as they managed to multiply their outputs and exports at very high rates. The joint ventures' regional and national contribution has been significant in terms of developing backward and forward linkages with other sectors and generating new employment and incomes. The recent trends suggest that further ties with the regional and national economies will develop gradually and that joint ventures will continue to expand their economic spaces.

The concept of economic space itself will require further elaboration and clarification in future. The most difficult task is to find new measures which will describe the nature and size of economic spaces better than the traditional sorts of ratios used in this study.

The technology policies, adopted by Venezuela following the Andean Pact agreement, have not been implemented readily in the circumstances reviewed here and did not influence the technological decisions in the aluminum industry. The joint ventures have in practice contributed to only a very limited transfer of foreign knowledge, which has not been accompanied by a more substantial 'absorption', 'assimilation' and 'adaptation' of imported technology. The complete reliance on foreign expertise has not so far created a serious obstacle to the rapid growth of the Venezuelan aluminum industry, although some signs of indigenous technological limitations have become apparent in the expansion of Venalum.

The focus and attitudes of the Venezuelan decision makers may have to be changed if indigenous progress in technology field is to be made.

On the other hand, confronted by a lack of political stability and the desire to maintain their vital interests, the MNCs may offer only limited or very slow transfer of technology to Venezuela and other countries. Technology and marketing channels remain the main bargaining power for the foreign investors and may determine their future survival in developing countries.

The real contribution of the aluminum joint ventures to promoting a synchronized growth strategy and accelerated regional growth may be questioned insofar as the Venezuelan companies have been unable to satisfy all conditions necessary for development agents. However, it is pure speculation whether other forms of business organization would have been more successful in stimulating 'synchronization processes', expanding 'economic spaces' and encouraging 'transfer of technology'. The problems encountered by SIDOR, as an inefficient public enterprise with falling production and exports, and Reynolds' attitudes, as well as those of other MNCs, towards Venezuela, characterized by their reluctance to make new large - scale investments in the country, and their lack of interest in technology transfer, would rather point to the contrary. Additionally, the experience of the Alcan Aluminium Ltd. with its Venezuelan private partner and the undecided future of ALCANVEN suggests that local private capital is even less ready to become engaged in serious industrial cooperation with MNCs.

It seems probable that if the present political climate persists

in Venezuela, joint ventures even in industries where more special know-how is involved, will be only a transitional form of development agent as the government will continue to press for higher local ownership. This strategy if pushed too far and too early, may prove to be self-defeating and may reduce the net positive effects of the accelerated growth of the Venezuelan industry.

APPENDIX I

Survey - Questionnaire

UNIVERSITÉ D'OTTAWA



OTTAWA ONTARIO
CANADA K1N 6N5

UNIVERSITY OF OTTAWA

FACULTÉ DES ARTS
GÉOGRAPHIE
ET AMÉNAGEMENT RÉGIONAL

FACULTY OF ARTS
GEOGRAPHY
AND REGIONAL PLANNING

April 28, 1980

Dear Sir,

I will be much obliged to you for filling up the enclosed questionnaire at your earliest convenience.

The purpose of this questionnaire is strictly academic - for a comparative study, i.e. Ph.D. thesis from University of Ottawa (Canada) and any information furnished by you will be kept confidential if so required. Since there is a serious lack of knowledge in the field of my study, I will appreciate very much any additional information that you can make available to me.

At the same time I sincerely hope that the final results of my research will contribute to better understanding of existing problems and will help to ease and promote future industrial cooperation between partners from different countries.

I would like to thank you very much for your kind assistance and understanding and I will be looking forward to hear from you soon, as I can only spend a very limited period of time in Venezuela.

Yours truly,

/Julius M. Walecki/

QUESTIONNAIRE

(Please give as much information as possible using
extra space in answering all questions !)

356

I. ORGANISATION

1. What were the main reasons for the choice of your present form of business organisation (joint venture; subsidiary; public enterprise) :
 - a) government regulations (e.g. Dec. 24, SIEX, Decree 63 of 1974, Decree 2031 of 1977, etc.)
 - b) more support and assistance from local government
 - c) special government guarantees (prices for raw materials, taxes, etc.)
 - d) economic growth (growth of output)
 - e) lower costs of production
 - f) less capital required
 - g) higher returns in a long run
 - h) import substitution
 - i) export promotion
 - j) integration of the country's economy
 - k) regional development (creation of new propulsive industry (firm))
 - l) more efficient use of human and natural resources
 - m) technocratic style of operation (as opposed to bureaucratic)
 - n) transfer of technology
 - o) development of local R & D capabilities
 - p) development of more appropriate technologies (optimal use of the country's factors of production)
 - r) creation of new employment
 - s) training of local labor
 - t) development of local infrastructure, social services, etc.
 - u) reduce foreign dependence and domination in Venezuelan industry
 - v) other (please describe)

/ Please mark 1, 2, 3, n according to the importance of a given reason /.
2. Have there been any major structural changes in organisation of your firm since the beginning of the operation (signing of a contract with partners) ?
/ If the answer is yes, please describe briefly /.
3. Have there been many interventions from the part of Venezuelan government in operations of your firm ?
/ Please describe briefly if possible /.

4. Who took the initiative regarding your joint venture ?

- a) Venezuelan government
- b) CVG
- c) transnational company
- d) other

5. Please describe financial participation in your firm :

year / partnership	partner (Co.)	ownership (%)
19.. (signing of contract)
19.. (construction stage)
1980

6. The changes in ownership have been introduced after negotiations and on request of :

- a) your firm
- b) partner
- c) Venezuelan government
- d) CVG
- e) other

7. Do the changes introduced represent better major objectives of your joint venture ?

/ If yes, please describe why /.

8. Does the present form of business organization secure good prospects for future cooperation and growth of your firm ? (attractive economic and secure political environment).

9. The main problems of operation of this joint venture were related to (or a result of) :

- a) government intervention (new regulations)
- b) disagreement between partners over :
 - 1. economic and expansion policy
 - 2. employment policy
 - 3. training programs
 - 4. transfer of technology
 - 5. allocation of R & D costs
 - 6. management of the firm
 - 7. production standards and control systems
 - 8. dividend payments, royalties and profits
 - 9. new export markets
 - 10. other reasons

/ Please mark according to the importance of a given reason and describe briefly if possible /.

II. TECHNOLOGY

1. Please describe briefly technology used by your firm (main processes), e.g. Hall-Heroult process, 200 electrolytic cells, annual requirement of inputs : materials A, B, M, etc.
2. Who was responsible for the choice of technology for your firm :
 - a) your Company
 - b) GVG-F
 - c) partners / please explain /
3. What kind of technology is used by your firm :
 - a) experimental technology (developed in)
 - b) advanced available technology (developed in)
 - c) intermediate technology (developed in)
4. The technology used by your firm was acquired with :
 - a) significant modifications
 - b) minor modifications
 - c) without any modifications

/ please explain in more details, e.g. changes made, by whom, etc. /
5. The criterion used for the choice of technology was :
 - a) maximization of output
 - b) minimization of production costs
 - c) maximization of employment
 - d) most efficient use of regional resources (human & natural)
 - e) promotion of exports
 - f) other / please describe and mark according to the importance of a given objective 1,2,3, M /
6. Please classify technology used by your firm as :

a) capital intensive	b) labor intensive	
a) static - acquired once for all	b) dynamic - continuous evolution	
a) import - biased	b) export - biased	c) neutral
7. Give main reasons for using a technology chosen for your firm :
 - a) requirements of the industry in general (a need to use certain technologies)
 - b) lack of alternative technologies
 - c) government pressure
 - d) distortions of factor prices in Venezuela :
 1. overpriced labor
 2. underpriced capital
 - e) other (please describe)

8. Have there been any changes in technology used by your firm since its creation ?
/ please describe indicating by whom they were introduced /
9. Have there been any engineering research and product design capabilities created at the plant level ?
10. Is there any R & D unit within your firm ?
/ if yes , please describe what are the main R & D activities /
11. How many patents have been registered by your company (and parent Company) ?
/ please explain also in what field /
12. What is the role of the plant's laboratory (if any) :
a) quality control
b) new methods
c) new products
d) other
/ please explain in more detail /
13. How many persons are employed by the company lab (R & D unit) ?
/ please specify : local ... , foreign .. ; changes over years ...)
14. What is the percentage of your total expenditure on R & D activities :
year / local R & D total R & D
.. ..
15. Does your firm cooperate with other R & D centers :
a) local
b) foreign
/ please specify with which centers and what kind of cooperation /
16. What are the main problems in developing local R & D capabilities ?
a) lack of demand for technology
b) lack of highly skilled labor
c) lack of government support
d) other ..
17. Does your company contribute to :
a) development of local R & D capabilities
b) development of more appropriate technologies
c) optimal use of regional resources
/ please explain in what form /
18. Who is responsible for the control of technology used by the firm ?
/ please describe the system of control /
19. Has there been any evaluation of technology made by local partner
(government agency) ?
/ please explain what kind of evaluation and by whom made /

III. PRODUCTION

1. What are the main products produced by your firm (Company) :

year /products	output	X	...	...	Y	(vol./value)	; value added
...
...
1980	...	..	..	..	..	..	...
2. Who was responsible for the established volume of production (output) ?
 - a) parent company
 - b) partners ..
 - c) CVG (Venezuelan government)
3. The projected output since the establishment of your firm has :
 - a) increased more than initially planned
 - b) increased but less than planned
 - c) decreased

/ please indicate by how much /
4. What is the fixed capital and working capital of your firm ?

/ please describe changes over years /
5. What are the main inputs (materials) used by your company in production process and where do they come from ?

year / inputs	materials	A,	B,	..,	M	(name of supplier : local -	foreign)
..
..
1980	..	..	..	..	..	..	..
6. Who is responsible for establishing prices for raw materials and final products ?
 - a) free market
 - b) parent Company
 - c) other / please explain in more detail and specify according to products /
7. In regard to projected domestic content as percentage of total input, the firm has :
 - a) increased domestic content
 - b) decreased domestic content
 - c) no change occurred / please describe /
8. What percent of the machinery and equipment for the plant was imported ?

/ please specify in more detail /.
9. Have there been any additional instalations added to the original plant ?

/ please describe what instalations and when added /

10. Who is responsible for the selling of final products of your company ?

- a) parent Company
- b) partners (please specify)
- c) CVG
- d) agreement between partners to the joint venture
- e) other (please explain)

11. What are the main markets for your products :

year /	name of consumers (local , foreign)		vol.
..
..
1980

12. What are the main problems in economic expansion of your firm :

- a) internal factors : higher costs, quality of products, management problems, etc.
- b) external factors : lack of markets (local, foreign), problems of supply, cooperation with other firms, etc.

/ please explain in more details major problems encountered by your Company /

13. Would you take part in other joint ventures with :

- a) government participation (CVG) yes / no
- b) local partners (private capital) yes / no
- c) multinational company yes / no

IV. EMPLOYMENT

1. Please give employment numbers of your company :

years / employees	production	administration	plant	Caracas	Total
..
..
1980

/ please describe in details as much as possible ! /

2. The firm's employment has :

a) increased over years more than initially planned

b) increased but less than planned

c) decreased

/ please indicate by how much /

3. Who is responsible for the employment policy (determination of the number of employees in a given year) :

a) your firm

b) partners

c) parent Company

d) government agency (e.g. CVG).

4. Have there been any intervention from the part of Venezuelan government or its agencies (CVG) to increase employment in your firm ?

5. What are the average wages in your firm :

years /	production (skilled , unskilled)		administration
..
..
1980

6. Does your company have special training programs for local labor :

a) in Venezuela

b) in other countries

/ please give some details including number of persons that participated in such programs and for how long /

7. Who took the initiative regarding training programs ?

a) your firm

b) CVG

c) parent Company

8. Have there been any changes in training program and who was responsible for them ?
- a) positive
- b) negative / please describe /
9. Does the training program include management and administration staff or only production ?
10. Please describe other services provided by your firm to your employees, local people, region (country) :
- e.g. housing program ... how many units / years /
- medical services ""
- recreation , etc.
11. The social programs (ref.10) were the initiative of :
- a) your firm
- b) parent Company
- c) CVG (Venezuelan government)
- d) other
12. Does your company contribute more than other firms to creation of local employment, training of labor and social services ?
- / please explain /

List of Main Companies to which the Survey-Questionnaires were distributed :

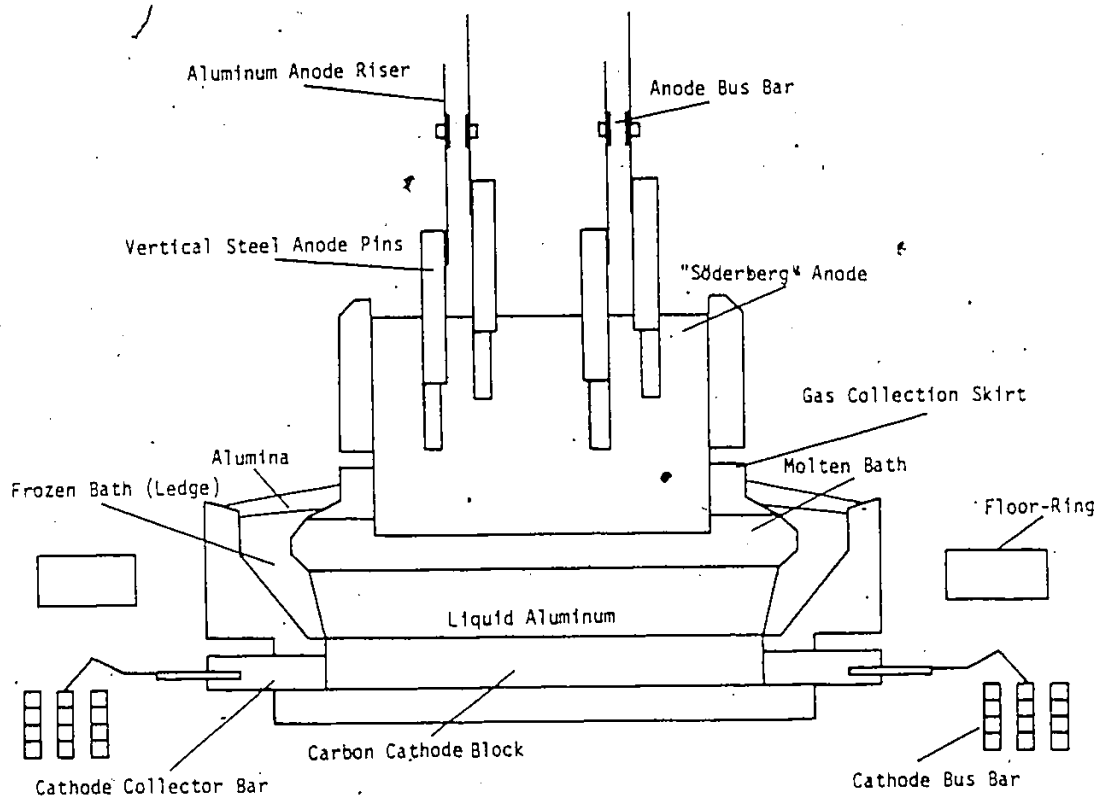
	Capital		Joint Venture
	public	private	
1. Corporacion Venezolana de Guayana (CVG)	x		
a. Division de Estudios, Planificacion e Investigacion (DEPI)			
b. Division de Desarrollo Industrial (DDI)			
2. Aluminio del Caroni, S.A. (ALCASA)	x	x	x
3. Industria Venezolana del Aluminio (VENALUM)	x	x	x
4. Interamericana de Aluminio, C.A. (INTERALUMINA)	x	x	x
5. Bauxita Venezolana (BAUXIVEN)	x		x
6. Empresa Suramericana de Aleaciones Laminados (SURAL,C.A.)		x	x
7. Aluminio de Venezuela, C.A. (ALCANVEN)		x	x
8. Aluminio Reynolds de Venezuela, S.A. (ALREYVEN)		x	
9. C.V.G. Siderurgica del Orinoco (SIDOR)	x		
10. C.V.G. Electrificacion del Caroni (EDELCA)	x		
11. C.V.G. Ferrominera Orinoco, C.A.	x		
12. Minerales Ordaz, C.A. (MINORCA)	x	x	x
13. Metalmeg, S.A.	x	x	x
14. Fabrica Nacional de Tractores y Motores (FANATRACTO)	x	x	x
15. Venezolana de Ferroaleaciones, S.A. (VENBOZEL)	x	x	x
16. Fior de Venezuela, S.A.	x	x	x
17. Cementos Guayana, S.A.	x	x	x
18. C.A. Pulpa y Papel Guayana	x	x	x
19. Fondo de Inversiones de Venezuela	x		

List of other Institutions where Interviews were conducted or Additional Information collected :

1. Banco Central de Venezuela
2. Canadian Embassy (Caracas) - Commercial Section
3. Centro de Estudios del Desarrollo (CENDES)
4. Corporacion Venezolana de Guayana (Ciudad Guayana)
5. Facultad de Ciencias Economicas e Sociales -
Universidad Central de Venezuela
6. Instituto Venezolano de Investigaciones Tecnologicas
e Industriales
7. Ministerio de Energia y Minas
8. Ministerio de Fomento
9. Oficina Central de Coordinacion y Planificacion
(CORDIPLAN) - Direccion de Economia Regional
10. Sociedad Interamericana de Planificacion
11. Sociedad Venezolana de Planificacion
12. Superintendencia de Inversiones Extranjeras (SIEX)
13. Alcan Aluminium Ltd. (Montreal)
14. Reynolds Metals Co. (Richmond, Va.)

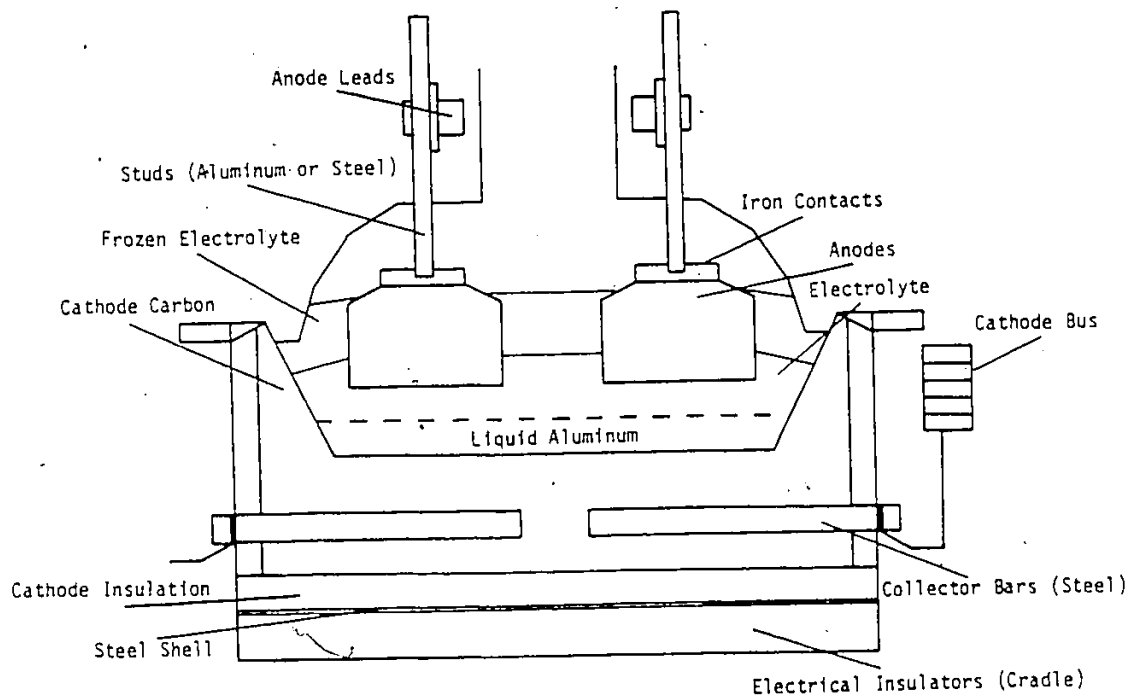
APPENDIX. III

Figure 4 : Cross-Section of an Electrolytic Cell Fitted with a Söderberg Anode



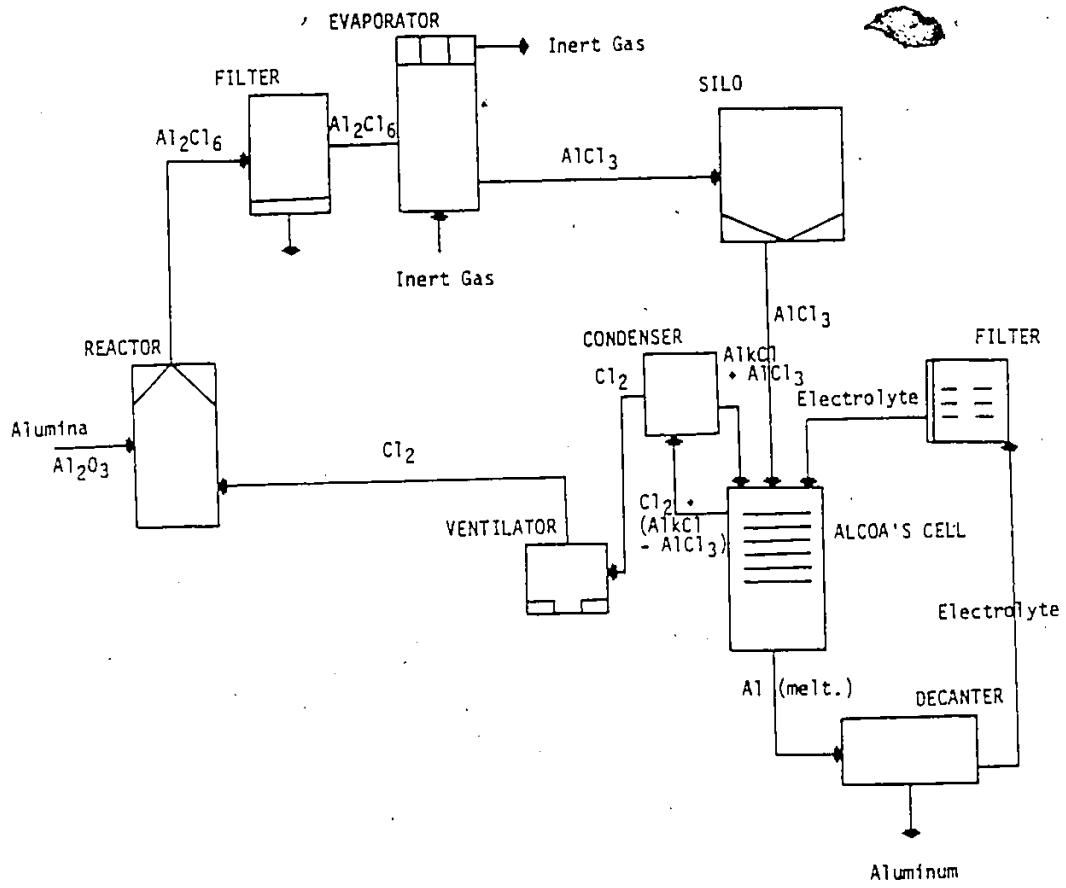
Source : Grjotheim & Welch, 1980, p. 43 .

Figure 5 : Cross-Section of an Electrolytic Cell Fitted with Pre-Baked Anodes



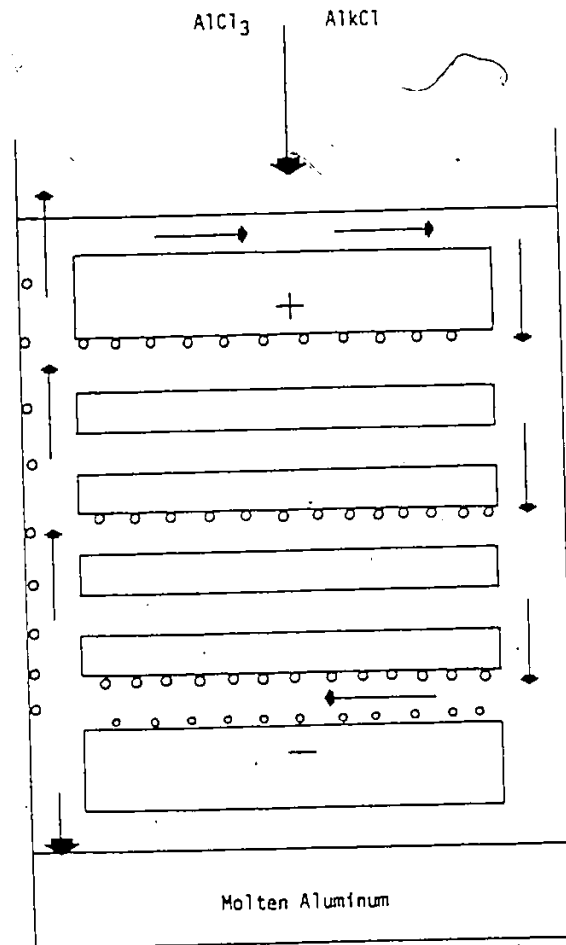
Source : Grjotheim & Welch, 1980, p. 5

Figure 9 : Schematic Diagram of the Alcoa's Aluminum Chloride Electrolysis Process



Source : Grjotheim, Krohn, Malinovsky, Matiasovsky & Thonstad, 1977, p. 15

Figure 10 : Schematic Diagram of the Alcoa's Cell for Electrolyzing Aluminum Chloride



Source : Grjotheim, Krohn, Malinovsky, Matiasovsky & Thonstad, 1977, p. 15

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ABSTRACT

Despite some progress in regional development theory there is pressing need for more theoretical work to offer concrete solutions to regional problems. The main purpose of this thesis is to relate theoretical concepts of a synchronized growth strategy and to present and assess the relative success of selected Venezuelan development agents within the framework of the proposed approach.

The thesis broadly outlines and recommends a synchronized growth strategy for stimulating regional development. The suggested strategy draws upon the rich tradition of development thought and supports a search for 'middle course' approaches. The proposed main role in regional development is played by new institutions or development agents which promote not only more economic growth but also introduce necessary institutional changes. Development agents are designed to ameliorate conflicting interests between different regional actors through increased cooperation and synchronization processes.

Increased government involvement in regional development may be particularly needed in cases where private initiative is weak or absent. The government should in such circumstances promote harmonization of interests between different regional actors and help create new development agents. The choice of specific industries for a given region can be based on a 'modified' concept of comparative advantage.

One of the most promising forms of development agent may be a joint venture with foreign capital. It brings the advantages of foreign investment while at the same time it increases local participation and assures better representation of regional interests. Coordination of actions and increased cooperation between partners is essential for the very creation and continuing existence and expansion of joint ventures. Besides synchronization, joint ventures have to continually expand their economic spaces and contribute to the real transfer of technology to be classified as development agents.

Regional problems in Venezuela are similar to those in many so called developing countries. Venezuela has to reduce its overdependence on one product (oil) and create new efficient industries which will be internationally competitive. The Venezuelan spatial model reflects also the traditional 'center - periphery' arrangement with excessive concentration of population and economic activities in the capital region. The accelerated growth of new industries in the periphery is required to correct the present situation, which creates serious obstacles to growth not only in less developed regions but also in the 'center' itself.

The Venezuelan government has initiated several policies and programs which have led to changes in the country's economic and spatial systems and made some progress towards synchronized growth. A key role has been played by the new 'potential' development agents, such as the Planning Agency (CORDIPLAN) and the Guayana Development Agency (CVG), the latter responsible for development of an industrial center in the Guayana region. The Guayana program has been designed to satisfy both regional and national

objectives. The CVG intended to use the growth center concept to promote development of basic industries which were believed to have comparative advantage in the region. The CVG has assisted in developing major industrial projects and a new urban center (Ciudad Guayana), but it has found it difficult to increase cooperation and harmonization of interests with other actual and potential regional actors. This has caused serious delays in implementation of many economic and social programs, including housing. The CVG's role as a development agent will most likely diminish in the future as new institutions have already emerged and will likely assume the leading role in the Guayana's progress. The new development agents were not always created as a result of synchronization processes in Venezuela. They are more often associated with the direct government intervention.

The thesis contains a detailed study of the Venezuelan aluminum industry and though it represents only a specific situation, many conclusions may be found useful for similar regional projects and studies.

The Venezuelan joint ventures operate within the international space of the aluminum industry and therefore are subject to several constraints. The world's industry has been dominated by the six MNCs (multinational corporations), which determine the terms of international competition for other producers. Their own strength has been built upon highly integrated operations from bauxite mining to the production of final aluminum products. The aluminum industry has continued to be attracted by low costs of energy and large markets. New entries in the industry have been frequent in recent years but in most cases they have required some form of association with the leading MNCs and support from local governments.

Development of the Guayana resources involved Venezuela negotiating a specific place among the world's aluminum producers. The country has also undertaken other related projects which are expected to strengthen the comparative advantage of its aluminum industry.

The role of joint ventures as potential development agents promoting synchronized growth has been examined. Joint ventures were chosen in Venezuela over other forms of business organization as they seemed to offer several important advantages. The country needed new efficient industries which would promote new exports and contribute to further integration of the regional and national economies, Indeed, the Venezuelan joint ventures have been successful in promoting economic growth. They have established important 'backward' and 'forward' linkages with the Venezuelan economy and there are signs that further linkages will develop both at regional and national level. The growth of exports has been spectacular. Nevertheless, the aluminum joint ventures have been unable to satisfy fully the expected conditions set for development agents. Their contribution to promoting a synchronized growth strategy has proved problematic. The cooperation and synchronization processes between local and foreign partners have not been easy. All partners continued to represent different interests and operated within different economic spaces. The continuous intervention on the part of the Venezuelan government which insisted on more local ownership, constituted a major threat to the stability of joint ventures. The contribution to the creation of local science and technology capacities has been minimal. Contrary to the Andean Pact policies the Venezuelan joint ventures have managed to avoid all restrictions imposed on technology imports by the member - countries.