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# INDUSTRIALIZATION AND PRODUCTIVITY

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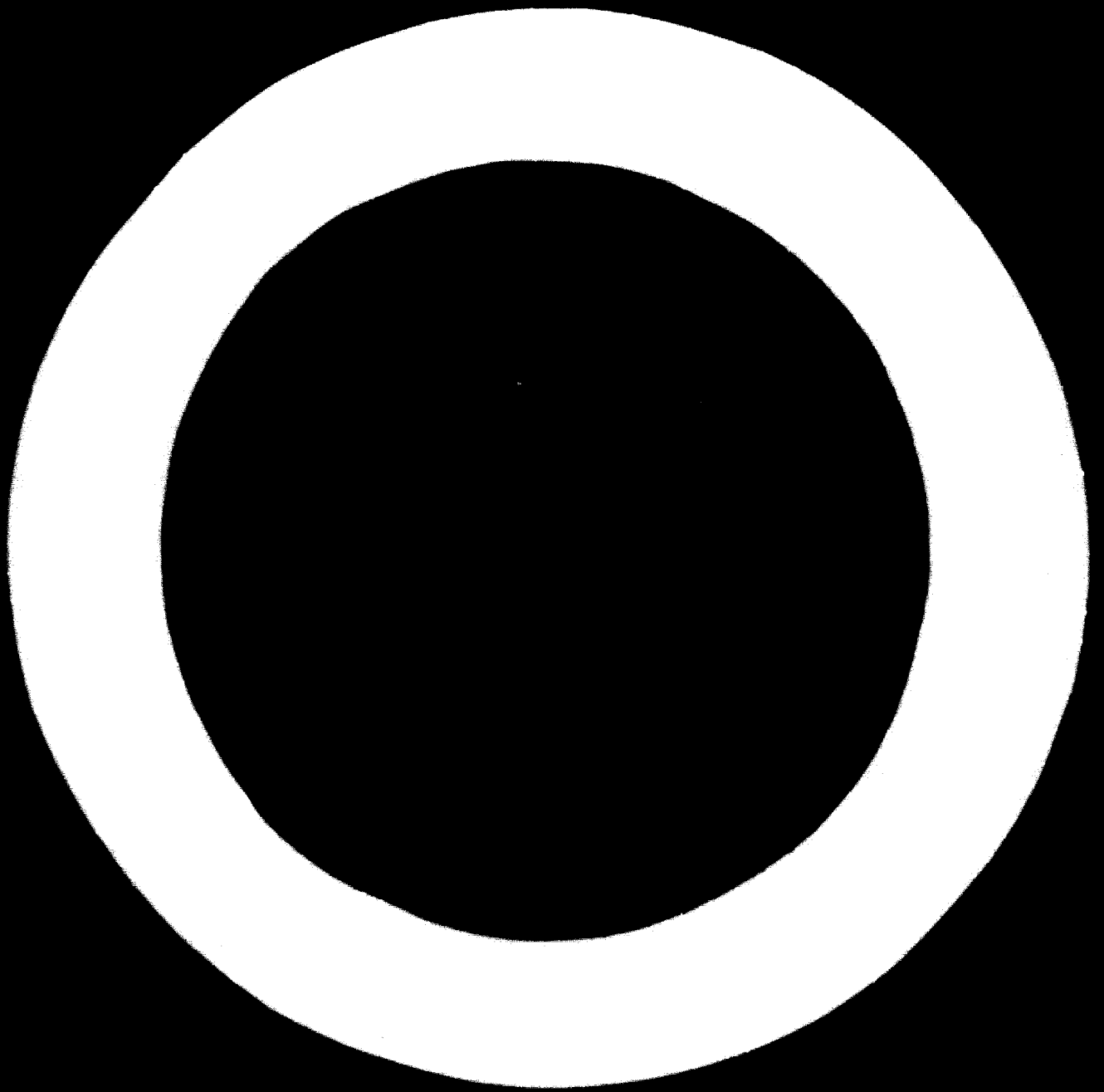
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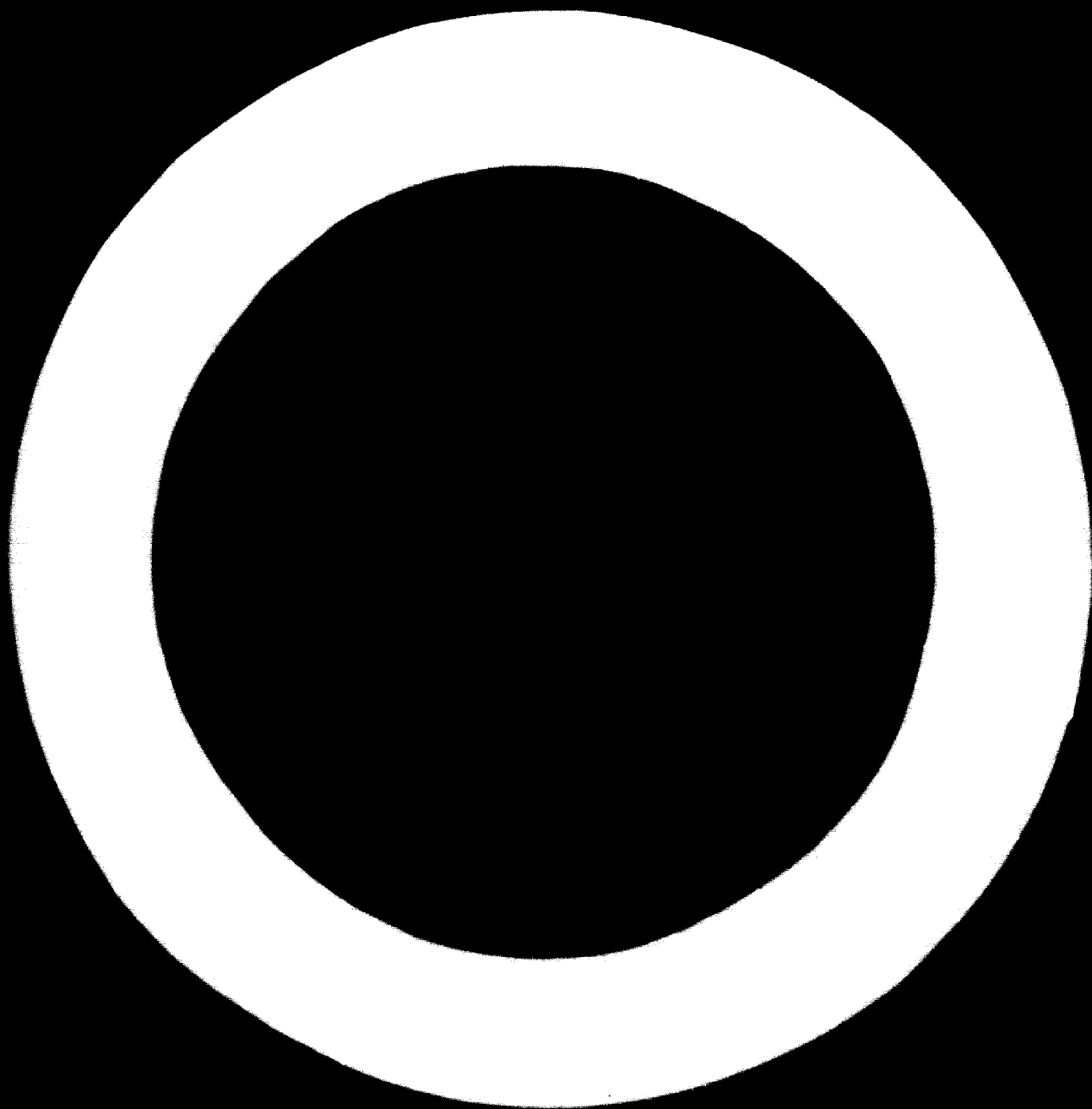
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## *Preface*

**T**he first three articles in this issue deal with recent UNIDO studies directed towards the development of useful planning tools. The next two articles focus on the planning of project implementation and are drawn from the materials frequently used in UNIDO's training seminars on implementation. The last article continues the new UNIDO series of studies and reports by selected experts on repair and maintenance in developing countries.

The first article, "Summaries of industrial development plans", briefly describes the framework which was recently used by UNIDO to summarize the industrial development plans of thirty selected developing countries. An actual summary of the industrial development plan of Ecuador is included as an example. In addition, the future work planned for the 1970s in connexion with the summaries is outlined.

The second article, "Industrial feasibility study extracts", explains UNIDO's new programme to provide selected useful information from some of the many feasibility studies on industrial projects in developing countries. This programme will serve as a companion programme to the one on profiles of manufacturing establishments, which provides detailed data on the cost and operating characteristics of plants already in operation.

The third article, "Checklist of concepts and problems in industrial planning", is being published in response to repeated requests from planners for a checklist that will serve to stimulate their thinking on industrial strategy, planning and implementation. It contains some 60 concepts and problems covering the seven general categories of: industrial strategy; the role of government and institutions; foreign markets; imported technology and foreign aid; planning; planning for implementation; and foreign investment and imports.

The next article is on "Planning the implementation of industrial projects". It was prepared by B. Berkoff of the Commonwealth Development Finance Company, in co-operation with the UNIDO secretariat, for use in UNIDO's training workshops on project implementation. The article describes the governmental and institutional arrangements needed for successful implementation and provides a general description of the over-all implementation process.

The article by Maurice D. Kilbridge of Harvard University focuses upon "Problems often encountered in implementing industrial projects in developing countries". Emphasis is placed on large-scale industrial projects and the implementation problems arising owing to the scarcity of skills and foreign exchange, the absence of an industrial base, and dependence upon foreign

equipment and technology. The need for careful advance planning of each stage of implementation is highlighted by an illustration showing the high costs of delays incurred in plant start-up and in reaching full-capacity operation. The use of critical-path programming for the control of project implementation is also illustrated.

The last article in this issue concerns "The role of maintenance and repair in the development of manufacturing industries". Its author, J. Molsberger of the University of Cologne, describes the effect of the interest rate, the wage rate, and the price of capital goods on the selection of an optimal maintenance and repair programme. He points out the effects of existing labour skills and of alternative choices of equipment and techniques, and then discusses various cost aspects and suggests some specific ways of improving maintenance and repair in manufacturing industries in the developing countries.



# Summaries of industrial development plans

In 1970, UNIDO published summaries of the industrial development plans of some thirty developing countries. Each summary follows a standard pattern, devised by UNIDO in order to present in a coherent and consistent form the industrial portion of the published economic development plans of selected countries. The purpose of the summaries is to provide national planners and international technical assistance experts with readily usable information on the industrial aspects of the development plans of a number of countries.<sup>1</sup> Such information, although obviously useful, is not usually available to a planner. Even when the plans of other countries can be obtained, considerable work still has to be done to put the information they contain into a relatively comparable and readily usable form.

Frequently, the industrial part of a country's development plan is dispersed throughout the over-all plan. Furthermore, the value data shown in the plans are in terms of a different currency for almost every country. And most plans are published in only English, French or Spanish; they are not usually available in one common language. The summaries are designed to overcome these obstacles and provide planners with readily usable, fairly comparable information on the industrial development plans of other countries.

## FEATURES OF THE SUMMARIES

The standard framework developed for the summaries follows the pattern outlined below.

### Goals and objectives

- Planned growth
- Other objectives

### Investment, strategy, policy and institutions

- Investment
- Strategy and policy
- Institutions

<sup>1</sup> *Summaries of the Industrial Development Plans of Thirty Countries*. A limited number of copies are available for distribution, on request to the Industrial Policies and Programming Division of UNIDO.

- Demand projections and data bases
- Planned development of manufacturing sectors
  - Planned growth of manufacturing sectors
  - Priority of sectors
  - Other sectoral plans
- Planned manufacturing projects
- Productivity and capacity utilization
- Organization and systems for planning and implementation
- Problem areas
- Previous industrial growth

Each plan summary is self-contained, and the exchange rate used for conversion, the source of the original plan, and similar footnotes appear directly in the summary itself. The coverage and completeness of the summaries vary widely, owing to a similar variation in the original plans from which they are prepared. While the average summary is about 15 pages long, individual summaries range from 4 to 36 pages.

## USING THE SUMMARIES

Some of the ways in which an industrial planner may use the plan summaries are, *inter alia*:

- As a reminder of the different planning areas that may be covered in a country's industrial plan and as an illustration of the detail that may be contained in each planning area;
- As a source of strategic approaches to industrial development;
- As a source of ideas for industrial sectors and industrial projects;
- As a source of ideas for planning and implementation systems and organizational arrangements;
- As a source of general information on the amount and type of support that countries intend to give to industrial development, compared with the development of other sectors of their economies;

As a reminder of possible problem areas in planning and plan implementation.

To facilitate further the use of the summaries, a cross-index has been prepared of selected objectives and strategy found in a number of the plans. These include:

Increasing the manufacturing percentage of GDP (by 5 per cent or more);

Channelling a high proportion (18 per cent or more) of total planned investment in the economy (and/or government investment) to industry;

Obtaining heavy foreign investment in manufacturing (40 per cent or more of the total investment in manufacturing);

Tapping domestic capital sources for investment in manufacturing (stock market, domestic credit agencies, banks etc.);

Increasing the utilization of existing manufacturing capacity;

Vertical or horizontal integration within manufacturing sectors;

Development of large-scale, heavy industries;

Increasing the substitution of domestic manufactures for foreign manufactures;

Increasing or diversifying manufactured exports;

Implementation of the planned manufacturing growth;

Regional co-operation with neighbouring countries;

Regional location of industry within the country;

Development of industrial estates;

Providing increased training for managers, skilled workers, and unskilled workers in manufacturing industries;

Improvement of the data used in planning and monitoring manufacturing growth.

#### CURRENT COUNTRY COVERAGE

The countries whose plans have been summarized to date fall into three groups, with respect to their degree of manufacturing development, as shown below.

The foregoing description of the framework and general purpose of the plan summaries is inadequate to convey to the reader the full extent of a plan summary. For this reason, a complete summary of the 1969-1973 industrial development plan of Ecuador is appended to this article.

#### CALCULATED 1965 "MANUFACTURING GDP"<sup>2</sup> per capita

\$4 to \$20	\$25 to \$50	\$60 to \$280
Bolivia	China (Taiwan)	Argentina
Ceylon	Ecuador	Chile
Ethiopia	El Salvador	Greece
India	Honduras	Malta
Jordan	Iraq	Panama
Kenya	Libya	Peru
Korea (Rep. of)	Malaysia	Puerto Rico
Pakistan	Philippines	Spain
Tanzania (Un. Rep. of)	Tunisia	Trinidad-Tobago
Togo		Venezuela
Uganda		

<sup>2</sup> Value added in manufacturing.

#### FUTURE WORK

Over the next several years, UNIDO expects to summarize a number of industrial development plans for the 1970s. As far as possible, priority will be given to the plans of those countries that are, or expect to be, co-operating on a regional basis with other countries. Such groups include the Central American Common Market (CACM), the Regional Co-operation for Development (RCD), the Association of South East Asian Nations (ASEAN), the Council for Mutual Economic Assistance (CMEA), the Arab League, the East African Community, the Andean Block and others.

Shortly after the publication of the thirty plan summaries, a small working group of consultants was convened to discuss the framework used and to recommend improvements in it, as well as additional uses of the summaries. This resulted in some rearrangement of the framework and two useful additions to it—a section providing general background information on the country and a section analysing the plan.

The new general background section will draw heavily upon UNIDO's own country files. Currently planned for inclusion in this section are information and data on the following subjects: government; population; gross domestic product; macroeconomic indicators; main industrial products and technologies; resources and sectors closely related to industry; over-all economic development strategy and policy; regional co-operation; systems for planning and plan implementation; and problems encountered during the previous plan period.

The main summary section will generally follow the outline shown above for the thirty plan summaries already published. However, it will contain more information on the linkage of the planned industrial growth with the growth planned in closely related sectors of the economy, such as infrastructure and agriculture.

The analysis section will be prepared only at the

request of the individual country and will remain confidential if the country so desires. It will focus upon the following areas, to the extent to which data and information are available:

- (a) Apparent differences from the regional or general developing country growth pattern "normal" in terms of:

- Objectives;
- Strategy;
- Growth rate of industrial and manufacturing GDP;
- Growth rate of manufactured exports;
- Priority of individual manufacturing branches;
- Linkages between manufacturing branches;
- Linkages between manufacturing and non-manufacturing sectors of the economy (agriculture, infrastructure etc.);
- Technology and degree of capital industry;
- Sources of financing industrial growth;

- (b) A review of special problems and apparent bottlenecks in:

- Productivity;
- Employment;
- Investment financing;
- Labour skills;
- Management skills;
- Markets;
- Product quality and standardization;
- Repair and maintenance;
- Capacity utilization;
- Exports;
- Imports;
- Project planning;
- Project implementation;

- (c) The degree of emphasis on increasing manufactured exports versus increasing manufactured import-substitutes;

- (d) Multilateral and bilateral measures to promote industrialization and assessment of the contribution of foreign sources of finance to the industrialization process;

- (e) Planned international or regional co-operation with other countries—plans and problem areas.

One of the more important uses of the analysis section may prove to be in facilitating the planning of industrial co-operation among countries seeking to co-operate regionally. Two such groups of countries have already approached UNIDO to discuss how the secretariat might assist in training selected members of their civil services to prepare summaries and make analyses of the industrial development plans of their member countries.

## Appendix

### SUMMARY OF THE 1969-1973 INDUSTRIAL DEVELOPMENT PLAN OF ECUADOR<sup>1</sup>

#### I. GOALS AND OBJECTIVES

##### A. Planned growth

	1966	1973	Average annual increase 1966-1973 (%)
Manufacturing GDP/capita (\$)	31.5	50.0	6.8
Total GDP/capita (\$)	215	265	3.1
Population (thousand)	5,330 <sup>a</sup>	6,730	3.4 <sup>b</sup>
Manufacturing GDP <sup>c</sup> (\$ million)	167	335	10.4
Total GDP (\$ million)	1,148 <sup>a</sup>	1,780	6.5
Manufacturing % of total GDP	15	19	

Exchange rate: C 1 = 18.18 sucres.

<sup>a</sup> From UN Monthly Bulletin of Statistics, July 1969.

<sup>b</sup> Plan does not indicate a rate, so the 1960-1968 actual rate is used.

<sup>c</sup> Includes cottage industries.

##### B. Other objectives

The objectives of the manufacturing sector are:

To increase the manufacturing per cent of total GDP;

To promote industries giving a comparative advantage in international markets;

To diversify and increase export production;

To correct deficiencies arising from the size of some establishments;

To adapt the industrialization process to the availability of local factors of production;

To promote industrial integration through the creation of industries complementary to those already existing.

General objectives for the whole economy are:

To maintain a 5 per cent average annual increase of exports;

To increase employment at 2.8 per cent per annum so that 77 per cent of the population will be economically active at the end of the period.

#### II. INVESTMENT, STRATEGY, POLICY AND INSTITUTIONS

##### A. Investment

Total planned gross investment from 1969 to 1973 will be \$2,250 million, of which 23 per cent, or \$526 million, will be in manufacturing.

<sup>1</sup> Preliminary Draft of Industrial Programme for 1969-1973, 138 pages.

*Average annual investment in the manufacturing sector  
(\$ million)*

	<i>Fixed capital</i>	<i>Increase in stocks</i>	<i>Financing capital formation</i>	<i>Total</i>
1966-1968	52.0	10.5	5.2	67.7
1969-1973	79.3	18.1	7.8	105.2

*Source of funds for investment in the manufacturing sector*

	<i>Annual average (\$ thousand)</i>	<i>Per cent</i>
<i>Domestic sources:</i>		
Reserves .....	32	30
Non-distributed profits .....	10	10
Subtotal	42	40
<i>Foreign sources:</i>		
Credit .....	42	40
Capital contribution .....	21	20
Subtotal	63	60
<i>All sources:</i>	Total 105	100

**B. Strategy and policy**

Prior to the elaboration of new projects, present capacity utilization and productivity will be studied. The potential use of local natural resources will be investigated. The restructuring of the manufacturing sector will favour the production of intermediate and capital goods at the expense of consumer goods. Major emphasis will be given to production for export.

A special effort will be made to stimulate exports to the Latin American Free Trade Area and other markets, according to the results of several market studies now being completed. Tariff policy will be used to channel investment into particular sectors, through complete or partial exemption from import duties.

An increasing proportion of exports from the agricultural sector will be in the form of manufactured or semi-manufactured goods. An import-substitution policy will be pursued, although it will be of less importance than in the previous five years. Monetary and exchange rate policy will be used to orient import substitution.

Marginal cottage industries will have to transform their production methods. Increased production in the manufacturing sector will offer employment opportunities to labour coming from the cottage industries.

Fiscal policy will be used:

- To remove all obstacles preventing further industrial development;
- To grant investment incentives;
- To prevent investment in marginal enterprises.

The following measures will be adopted to limit speculation and to channel investment resources to the industrial sector:

Mortgage revenues will be liable to income tax;

A land tax will be instituted following a survey of land value and ownership;

A tax will be imposed on the resale of private cars;

Free exchange rate markets will be eliminated.

To attract foreign investment:

Feasibility studies will be carried out and priorities set;

The advantages Ecuador offers will be publicized;

Statutes regulating foreign investment will be clarified.

Labour policy will involve:

The creation of employment and labour-mobility offices in the main urban centres;

Labour training according to the needs of industrial development;

The improvement of industrial security and hygiene.

**C. Institutions**

The 1957 Law on Industrial Development (Ley de Fomento Industrial) was revised in 1962 and in 1964. Its objectives are:

To attract domestic and foreign investment;

To improve the balance-of-payments position, through further import substitution and increased exports;

To create employment opportunities;

To encourage the use of local primary resources.

Credit for industrial investment will be made available largely through:

The National Securities Commission—Financial Corporation (Comisión Nacional de Valores—Corporación Financiera);

The Ecuador Finance Corporation (COFIEC);

The National Banking system.

The Central Bank will be responsible for medium- and short-term credit, and the corporations will be responsible for long- and medium-term credit.

It is proposed that the National Securities Commission should:

Intervene directly in the establishment of firms and participate in their social capital;

Channel investment to top-priority projects;

Facilitate the obtaining of credit by small firms;

Contribute to training in business administration;

Improve its project-evaluation system in order to reduce delays.

Government policy will be primarily concerned with:

The reform of the legal system regulating the establishment of financial institutions;

The improvement of banking and commercial legislation.

The National Technological Institute (Instituto Nacional de Tecnología) will carry out further technological research, in close co-operation with institutions concerned with planning, technical assistance, finance, and graduate education.

### III. DEMAND PROJECTIONS AND DATA BASES

The objectives set in the Plan were calculated on the basis of:

Annual inquiries;

The 1965 Industrial Census;

The results of feasibility studies.

The year 1966 was chosen as the starting point for most of the projections that were made.

Import-substitution policy was formulated on the basis of:

Data on imports of manufactured goods;

Projections made of future import requirements.

### IV. PLANNED DEVELOPMENT OF MANUFACTURING SECTORS

#### A. Planned growth of manufacturing sectors

##### Value added by the manufacturing sector<sup>a</sup>

	1968—1973		Average	
	1968 (\$ million)	1973 (\$ million)	Total increase (%)	annual increase (%)
Food .....	43	69	60	10
Drink .....	13	16	23	4
Cigarettes and tobacco .....	1.5	2	33	6
Textiles .....	17.5	26	48	8
Shoes and clothing	1.2	1.5	25	5
Wood .....	3.5	6	71	11
Furniture .....	2	2.8	40	7
Paper and cardboard .....	5.5	22	300	32
Printing .....	6	10	67	11
Leather and hides	0.8	1.1	37	6
Rubber products	5	7.5	50	9
Chemicals .....	12	36	200	25
Petroleum derivatives .....	10	16	60	10
Non-metallic minerals .....	7	12	71	11
Basic metals .....	0.7	6.6	843	55
Metal products	4.5	9.5	111	16
Miscellaneous	3.3	5.5	166	11
Total	136.5	249.5	85	13

<sup>a</sup> Excluding cottage industries.

#### B. Priority of sectors

##### Changes in manufacturing structure in terms of value added<sup>a</sup> (Percentages)

	1966	1973	Average annual increase
Consumer goods .....	51	44	9
Intermediate and capital goods .....	49	56	15
Total	100	100	13.2

<sup>a</sup> Excluding cottage industries.

#### C. Other sectoral plans

Imports of manufactured goods will decrease by 50 per cent, and domestic production of manufactured goods will increase their contribution to domestic demand to 69 per cent. Import substitution will be most important in:

Petroleum derivatives;

Paper and cardboard;

Iron, steel and bronze;

Plastic fibres;

Steel lamination;

Metallic structures;

Flour and yucca starch.

Import substitution will be \$71 million in 1973, compared with \$6.7 million in 1969.

##### Cumulated value of import substitution (\$ thousand)

	1969	1973
Food .....	40	5,000
Cigarettes .....	—	2,620
Textiles .....	800	3,800
Paper and cardboard	3,900	14,860
Leather and hides	—	170
Rubber products	—	200
Chemicals .....	750	6,960
Petroleum derivatives	—	18,700
Non-metallic minerals	60	1,400
Basic metals .....	250	7,690
Metal products	860	9,170
Total	6,660	70,660

The value of imports of manufactured goods will increase from \$161 million in 1966 to \$298 million in 1973.

*Value of imports*

	1966	1973	Change
	(\$ thousand)	(\$ thousand)	(%)
Food .....	5,660	770	-86
Drink .....	560	1,110	98
Cigarettes .....	4,480	50	-99
Textiles .....	10,670	22,440	110
Shoes and clothing .....	510	1,920	276
Wood .....	400	1,110	178
Furniture .....	10	—	—
Paper and cardboard .....	6,720	2,250	-67
Printing .....	1,400	1,260	-10
Leather and hides .....	50	160	220
Rubber products .....	1,720	270	-84
Chemicals .....	29,950	111,710	273
Petroleum derivatives .....	3,220	—	—
Non-metallic minerals .....	4,830	9,620	99
Basic metals .....	15,120	16,000	6
Metal products .....	68,560	96,470	41
Miscellaneous .....	6,900	32,500	371
<b>Total</b>	<b>160,760</b>	<b>297,640</b>	<b>85</b>

Exports will increase to 9.8 per cent of domestic production.

*Value of industrial exports*  
(\$ thousand)

	1968	1973
Food .....	13,970	39,300
Drink .....	10	1,300
Cigarettes and tobacco .....	10	700
Textiles .....	30	990
Shoes and clothing .....	700	2,210
Wood .....	5,450	11,000
Furniture .....	20	660
Leather and hides .....	130	220
Chemicals .....	3,110	8,950
Non-metallic minerals .....	—	1,010
Miscellaneous .....	130	330
<b>Total</b>	<b>23,560</b>	<b>66,670</b>

By 1973, the exports of sugar, wood, cocoa products, fisheries, and meat will account for 65 per cent of the total. Planned exports, by product (those valued at over \$550,000 in 1973), are listed below.

*Exports by product*  
(\$ thousand)

	1968	1973
Meats .....	—	6,650
Shellfish, fish flour .....	3,690	7,130
Sugar .....	7,840	14,020
Banana derivatives .....	460	2,320
Canned fruit and juice, jelly and marmalade .....	60	1,310

	1968	1973
Caramel and biscuits .....	20	1,400
Cocoa products .....	1,540	6,000
Tea .....	—	990
Brewing malt .....	—	1,130
Tobacco products, cigarettes .....	10	700
Hand fibres, cables etc. ....	30	990
Shoes, clothing, sombreros .....	700	2,210
Wood .....	5,450	11,000
Furniture .....	20	660
Pharmaceuticals .....	1,580	2,820
Pyrethrum extract .....	1,290	2,380
Castor oil .....	—	1,580
Acetone, butane, ethyl and butyl acetate .....	—	1,390
<b>Total</b>	<b>22,690</b>	<b>64,680</b>

Employment in the manufacturing sector will change as shown below.

	1968		1973	
	No. of persons employed	Per cent	No. of persons employed	Per cent
Manufacturing .....	42,580	18	68,400	27
Cottage industries .....	189,800	82	185,600	73
<b>All manufacturing</b> .....	<b>232,380</b>	<b>100</b>	<b>254,000</b>	<b>100</b>

Manufacturing employment by subsector (excluding cottage industries) will increase by 60 per cent.

*Employment by industry*  
(Number of persons)

	1968	1973
Food .....	11,624	18,104
Drink .....	2,186	2,781
Cigarettes .....	250	330
Textiles .....	10,085	15,086
Shoes and clothing .....	1,100	1,386
Wood .....	1,798	2,815
Furniture .....	1,150	1,506
Paper and cardboard .....	900	2,345
Printing .....	2,582	3,288
Leather and hides .....	599	750
Rubber products .....	728	979
Chemicals .....	3,000	8,889
Petroleum derivatives .....	1,541	2,690
Non-metallic minerals .....	1,700	2,760
Basic metals .....	122	1,063
Metal products .....	2,435	5,025
Miscellaneous .....	1,000	1,375
<b>Total</b>	<b>42,800</b>	<b>71,170</b>

Horizontal integration will be promoted in selected industries such as textiles and metallurgy.

Planned projects  
1969-1973  
(\$)

#### V. PLANNED MANUFACTURING PROJECTS

The Plan includes 171 projects, contributing \$64 million to manufacturing GDP and requiring a total investment of \$163 million. The main objectives of the planned projects are:

- To lead to a greater output per establishment;
- To invest capital at a much higher rate per plant and per person occupied;
- To increase annual average wages;
- To utilize domestic raw materials in a much larger proportion than imported ones;
- To attain a higher level of productivity.

The planned projects will involve:

An investment and output of:	
Fixed investment .....	138,710,000
Circulating investment .....	24,610,000
Gross output .....	200,050,000
Value added .....	63,680,000
Materials and power consumption of:	
Domestic materials .....	103,630,000
Imported materials .....	23,080,000
Fuel and electric power .....	9,350,000
Other characteristics:	
Employment (number of persons) ..	9,765
Wages and social security .....	11,585,000
Average fixed investment per project	810,000
Average fixed investment per person	
employed .....	14,200
Average annual wage per person	
employed .....	1,200

Average investment per establishment will exceed \$900,000 as compared with \$360,000 in the previous Plan. Foreign loans will account for 57 per cent of the total required investment.

#### PLANNED MANUFACTURING PROJECTS BY INDUSTRIAL SECTOR

Sector	No. of firms	Value of production	Value added	Fixed capital	Investment			Employment		Raw materials		
					Circulating capital	Total	Foreign (%)	No. of persons	Remuneration and social benefits (\$ thousand)	Domestic	Imported	Total
		(\$ thousand)			(\$ thousand)					(\$ thousand)		
Food .....	61	67,410	11,480	15,750	5,190	20,940	53	2,237	2,320	54,420	710	55,130
Drink .....	3	2,150	855	955	740	1,695	39	194	130	870	390	1,260
Tobacco .....	2	3,290	1,630	405	1,390	1,795	60	69	135	1,520	120	1,640
Textiles .....	12	10,820	3,770	7,260	1,600	8,860	53	928	905	6,020	590	6,610
Shoes and clothing .....	1	535	110	40	40	80	62	39	40	420	—	420
Wood and cork .....	14	3,750	1,500	2,430	550	2,980	55	408	490	1,730	380	2,110
Wood furniture .....	1	300	95	130	30	160	50	31	35	200	5	205
Paper and carboard .....	6	20,620	9,230	22,170	2,560	24,730	47	1,018	1,120	4,390	5,140	9,530
Printing .....	1	81	55	60	40	100	45	14	20	—	25	25
Leather and hides .....	2	500	190	160	30	190	60	116	75	230	70	300
Rubber .....	4	280	180	300	50	350	53	51	55	50	45	95
Chemicals .....	2	29,030	13,070	35,790	4,270	40,060	58	1,152	1,590	8,270	5,450	13,720
Petroleum and carbon ...	1	26,720	6,430	24,200	1,720	25,920	74	113	180	18,920	250	19,170
Non-metallic minerals ...	15	6,310	3,580	9,970	830	10,800	58	586	740	1,000	500	1,500
Basic metals .....	6	13,110	4,640	11,060	3,280	14,340	42	752	1,160	3,510	3,640	7,150
Metal products .....	13	9,260	4,160	5,990	1,680	7,670	53	1,465	1,660	1,790	2,940	4,730
Electrical equipment .....	6	2,400	870	850	480	1,330	53	208	330	285	1,215	1,500
Transport material .....	2	3,475	1,790	1,190	120	1,310	59	444	5	5	1,600	1,605
<b>Total</b>	<b>152</b>	<b>200,041</b>	<b>63,635</b>	<b>138,710</b>	<b>24,600</b>	<b>163,310</b>	<b>56.5</b>	<b>9,825</b>	<b>10,990</b>	<b>103,630</b>	<b>23,070</b>	<b>126,700</b>

SUMMARIZED INVENTORY OF MANUFACTURING PROJECTS

Project	Date of completion	Location	Annual capacity <sup>a</sup>	Total investment (\$ thousand)	Employment (no. of persons)
Food: (61 projects)				(20,495)	(2,236)
Cold storage room .....	1970	Pichincha	12,000	1,105	77
	1969	Loja	12,000	1,105	77
	1972	Chimborazo	4,250	515	44
	1972	Manabi	6,600	595	53
	1970	Carchi	5,330	550	53
	1973	Cotopaxi	5,000	550	53
	1973	Esmeraldas	6,000	550	53
Storage room .....	1973	Los Rios	6,800	550	54
	1973	Pastaza	6,000	250	39
Refrigeration network .....	1969	Guayas	7,500	275	40
	1970	Pichincha	5,000	200	27
	1971	Tungurahua	10,000	480	50
Packing poultry .....	1972	Azuay	10,000	480	50
	1971	Pichincha	590	220	41
Sausages .....	1972	Guayas	590	220	41
Powdered milk .....	1972	Azuay	874	65	21
Milk regenerator .....	1972	Cotopaxi	800	560	49
Pasteurizing and milk regenerator ..	1971	Manabi	5,000 kilolitres	200	29
	1972	Chimborazo	3,075	180	21
Concentrated fruit juice .....	1972	Loja	3,075	180	21
Orange juice .....	1973	Los Rios	750	530	73
Naranja juice .....	1970	Los Rios	6,000	720	49
Canned vegetables .....	1972	Tungurahua	2,045	440	38
	1970	Pichincha	227	80	21
Canned mushrooms, asparagus .....	1972	Loja	227	80	24
	1970	Pichincha	600	450	75
Tomato sauce and paste .....	1972	Manabi	315	220	28
Marmalades and jellies .....	1969	Imbabura	315	220	28
	1970	Guayas	1,501	145	29
Canned fish .....	1969	Guayas	898	105	22
	1972	Esmeraldas	898	105	22
Processed pig fat .....	1970	Pichincha	1,200	155	13
Rice oil .....	1972	Los Rios	1,200	390	24
Rape-seed oil extract .....	1970	Chimborazo	2,200	390	41
Palm-oil extract .....	1971	Los Rios	5,000	750	118
Oil extracts .....	1972	Esmeraldas	1,185	90	14
	1970	Pichincha	3,000	80	19
Yucca flour .....	1971	Los Rios	3,000	80	19
	1972	Manabi	5,000	80	19
Yucca starch .....	1970	Los Rios	5,378	810	42
Cocoa derivatives .....	1970	Guayas	2,000	?	58
Glucose .....	1970	Manabi	1,800	215	12
Banana puree .....	1971	El Oro	4,773	670	101
Dehydrated bananas .....	1971	El Oro	572	95	44
Coffee .....	1972	Manabi	210	840	39
Protein-enriched food .....	1970	Los Rios	1,500	550	100
Baby food .....	1971	Pichincha	650	105	14
Crushed dates .....	1971	Carchi	1,400	105	18
	1970	Manabi	12,000	140	12
Ice cubes .....	1971	Guayas	3,000	40	4
	1971	Esmeraldas	6,000	65	5
	1971	El Oro	4,000	40	4
Tuna fish refrigeration .....	1971	Manabi	6,000	800	33

<sup>a</sup> In metric tons, unless otherwise indicated.



## SUMMARIZED INVENTORY OF MANUFACTURING PROJECTS (continued)

Project	Date of completion	Location	Annual capacity <sup>a</sup>	Total investment (\$ thousand)	Employment (no. of persons)
<b>Food: (continued)</b>					
Dehydrated fodder .....	1970	Pichincha	19,670	345	43
Alfalfa flour .....	1971	Imbabura	2,450	130	15
Balanced diet .....	1970	Pastaza	5,500	90	14
Fish oil and flour .....	1971	Guayas	4,500	350	16
	1972	El Oro	4,500	350	16
	1971	Manabi	4,500	350	16
Shark products .....	1973	Guayas	250	90	20
Dehydrated soups .....	1970	Guayas	200	375	41
<b>Textiles: (12 projects)</b>				(8,665)	(948)
Wool washing .....	1971	Chimborazo	200	125	12
Cotton ginning .....	1971	Esmeraldas	1,100	100	32
Thread .....	1969	Tungurahua	60	250	47
Printed cloth .....	1969	Tungurahua	120,000 metres	330	37
Synthetic fibre cloth .....	1969	Pichincha	300,000 metres	320	31
Cabuya material .....	1969	Manabi	743	180	22
Rope, thread, cloth .....	1972	Imbabura	20,000	5,980	491
Manila hemp .....	1973	Pastaza	600	130	22
Sanitary textiles .....	1971	Pichincha	140	330	52
Sanitary textiles .....	1969	Guayas	140	340	32
Finished textiles .....	1971	Pichincha	2,000	480	150
Fishing nets .....	1973	Manabi	32	100	20
<b>Paper and cardboard: (6 projects)</b>				(24,785)	(1,018)
Newspaper .....	1973	Guayas	30,000	8,300	335
Paper and cardboard .....	1969	Los Ríos	26,000	4,590	146
Kraft paper .....	1972	Guayas	40,000	10,270	401
Hemp paper .....	1972	Los Ríos	2,500	1,240	44
Smooth cardboard .....	1971	Guayas	1,200	65	15
Wax paper containers .....	1969	Guayas	480	320	77
<b>Chemicals: (21 projects)</b>				(39,925)	(1,165)
Acetone, butanol, ethyl acetate, butyl acetate, acetic acid .....	1972	Guayas	2,600	2,050	62
Citric acid .....	1972	Guayas	1,000	1,700	41
Soda .....	1973	Guayas	10,000	495	38
Chlorinated soda (NaCl) .....	1971	Chimborazo	5,900	1,265	38
Aluminium sulphate .....	1970	Guayas	5,400	260	17
Ammonia .....	1973	Guayas	60,000	9,680	107
Castor oil .....	1970	Manabi	12,600	1,210	61
Glycerine and fatty acids .....	1970	Guayas	445	90	10
Essential oils and dyes .....	1970	Pichincha	21	60	14
Antibiotics .....	1973	Pichincha	9	1,400	32
Urea .....	1972	Guayas	30,000	9,630	89
Insecticides .....	1969	Guayas	1,400	350	17
Pyrethrum extract .....	1973	Cotopaxi	45	275	44
Processed pyrethrum extract .....	1970	Cotopaxi	25	270	18
Nylon textiles .....	1972	Pichincha	1,000	5,310	197
Rayon .....	1972	Guayas	2,000	5,310	297
Printing dyes .....	1969	Pichincha	300	80	13
Tanning extract .....	1970	Esmeraldas	2,000	150	28
Papain .....	1969	Pastaza	21	80	6
Composite PVC .....	1969	Guayas	2,000	200	25
Acrilan sheets .....	1970	Pichincha	30	60	11

<sup>a</sup> In metric tons, unless otherwise indicated.

SUMMARIZED INVENTORY OF MANUFACTURING PROJECTS (continued)

Project	Date of completion	Location	Annual capacity <sup>a</sup>	Total investment (\$ thousand)	Employment (no. of persons)
<b>Petroleum and carbon: (1 project)</b>					
Oil refinery	1972	Pichincha	1,000,000	(25,920) 25,920	(113) 113
<b>Non-metallic minerals: (15 projects)</b>					
Pressed brick	1969	Pichincha	27,000	(10,880) 260	(581) 31
Fire-brick		Azuay	24,000	260	34
Arampoules of pharmaceutical glass	1971	Azuay	1,032	265	22
Crystal	1973	Guayas	16,150,000	80	15
Glass	1970	Guayas	180	75	9
Insulating ceramics	1970	Guayas	5,500	1,100	95
China	1971	Cotopaxi	360	350	34
Kaolin washers	1969	Guayas	300	150	24
Portland cement	1969	Azuay	6,000	380	28
White cement	1972	Pichincha	100,000	4,400	110
Hydrated lime	1972	Cañar	12,000	2,200	72
Tiles	1973	Pichincha	3,000	120	20
Asbestos cement tubes	1969	Pichincha	500,000	65	16
Abrasive sandpaper and grindstone	1970	Azuay	6,240	1,100	49
	1971	Pichincha	80	75	22
<b>Basic metals: (6 projects)</b>					
Iron and steel works	1971	Guayas	30,000	(14,330) 3,470	(662) 221
Special steel and iron bars		Pichincha	30,000	3,470	221
Iron laminators	1973	Guayas	24,000	4,670	100
Collapsible tubes	1971	Guayas	25,000	2,500	85
Bronze works	1969	Pichincha	30	110	15
	1969	Guayas	200	110	20
<b>Metal products: (13 projects)</b>					
Metallic structures	1970	Pichincha	6,000	(7,675) 1,590	(1,465) 410
Agricultural machines and other metallic structures	1972	Guayas	6,000	1,590	410
Packages, casks etc.	1971	Manabí	3,200	260	34
Cutlery	1973	Guayas	70	260	73
Hardware for buildings	1970	Guayas	250	180	44
Printing machines		Pichincha	250	180	44
Domestic utensils	1969	Pichincha	25	55	10
Faucets, pumps	1973	Pichincha	1,800	2,030	199
Forged steel and tools	1973	Pichincha	460	460	38
Dies	1973	Pichincha	1,500	500	100
Assembly of sewing machines and typewriters	1972	Azuay	100	310	28
Lanterns and press	1972	Pichincha	3,000	150	60
	1971	Pichincha	30	110	15
<b>Electrical equipment: (6 projects)</b>					
Electric motors	1972	Guayas	9,000	(13,325) 2,750	(206) 45
Electric appliances	1970	Guayas	8,000	2,300	42
Electric piles	1969	Guayas	1,300	4,510	46
Small electric pumps	1971	Pichincha	28	1,375	31
Electric utensils	1971	Pichincha	47	880	26
Batteries	1969	Guayas	90	1,510	16

<sup>a</sup> In metric tons, unless otherwise indicated.

## VI. PRODUCTIVITY AND CAPACITY UTILIZATION

	Productivity		1973		Increase in productivity (%)
	1966	Value added per man (\$)	Number employed	Value added per man (\$)	
Factory .....	37,600	2,980	68,400	3,659	23
Cottage industry .....	188,200	292	185,600	445	52
All manufacturing .....	225,800	740	254,000	1,310	77

Improved productivity and technology will lead to greater investment in existing firms.

*Fixed capital to output ratios of all manufacturing in 1965 versus ratios of projects included in the 1969-1973 Plan (Capital to gross output ratio)<sup>a</sup>*

	1956 - All manufacturing	1969-1973 Planned projects
Food .....	0.29	0.73
Drink .....	0.43	0.90
Tobacco .....	1.31	4.01
Textiles .....	0.29	0.52
Shoes and clothing .....	0.61	2.74
Wood and cork .....	0.68	0.62
Wood furniture .....	6.21	0.72
Paper and cardboard .....	0.52	0.41
Printing .....	0.44	0.89
Leather and hides .....	0.49	1.17
Rubber .....	0.60	0.61
Chemicals .....	0.69	0.36
Petroleum and carbon .....	0.28	0.26
Non-metallic minerals .....	0.39	0.36
Basic metals .....	0.46	0.42
Metal products .....	0.46	0.70
Electrical equipment .....	0.46	1.02
Transport material .....		1.50
All manufacturing .....	0.37	0.46

Over-all % increase = 24%.

<sup>a</sup> Fixed capital as a per cent of gross output (not of value added).

## VII. ORGANIZATION AND SYSTEMS FOR PLANNING AND IMPLEMENTATION

The Industrial Development Plan will be realized largely through the efforts and co-operation of:

- The Ministry of Industry and Commerce;
- The National Planning Board (Junta Nacional de Planificación);
- The Development Centre (Centro de Desarrollo — CENDES);
- The National Securities Commission (Comisión Nacional de Valores);

The Ecuador Finance Corporation (Corporación Financiera Ecuatoriana — COFIEC);

The National Banking system;

The Regional Economic Development Corporations (Corporaciones Regionales de Desarrollo Económico);

The Industrial Chambers of Commerce (Cámaras Industriales).

The functions of the Ministry of Industry and Commerce are:

To adapt legislation to the requirements of industrialization;

To supervise the application of the Law on Industrial Development.

The structure of the Department of Industries should be improved.

The National Planning Board is responsible for feasibility studies and setting priorities.

The functions of the Development Centre are:

To grant technical assistance;

To promote industrialization;

To prepare feasibility studies of specific projects;

To attract investment to specific projects.

Particular attention will be paid by the Centre to questions of industrial productivity. It will co-ordinate its activities with those of other institutions.

Regional economic development corporations will operate in line with the general industrial programme. The National Planning Board and the Development Centre will co-operate with the regional corporations.

The Industrial Chambers of Commerce will bring about more discussion between the public and private sectors.

To promote the industrial development programme:

The ministries and the private sector will hold discussions;

The National Planning Board will explain the development plans and projects to civil servants in order to engage their active support;

Information about the Plan will be given freely

to the private sector whenever its role is of major importance.

**To promote credit availability:**

The private sector will be advised, in detail, on all investment opportunities;

Advice will be given as to the form in which loan requests and project information should be given to financial institutions;

Co-operation will be established with international organizations;

Procedures to maintain an adequate credit flow must be established, through co-ordination between the Central Bank, the Monetary Board, and the national credit institutions.

Professional training will continue to be undertaken by the Ecuador Professional Training Services (Servicio Ecuatoriano de Capacitación Profesional — SECAP).

**In the short run:**

Labour should be trained abroad;

Teachers should be trained in order to improve the quality of instruction in technical and professional institutes;

Foreign experts should be obtained to manage new firms and train local technicians.

**In the long run:**

The University should be complemented by professional training schools;

Post-graduate studies should be established;

Industrial enterprises should establish a fund for the promotion of professional training.

Technical and vocational schools will orient education according to the requirements of industrialization.

**VIII. PROBLEM AREAS**

Industrial development will be encouraged, but investment will still depend upon:

The size of the market;

The adequacy of the economic infrastructure;

The availability of the factors of production and transport facilities;

Prices and wages;

Economic and social stability.

**IX. PREVIOUS INDUSTRIAL GROWTH**

Value added by the manufacturing sector (excluding cottage industries) rose from \$112 million in 1966 to \$135 million in 1968—an increase of 20 per cent.

# *Industrial feasibility study extracts*

**I**ndustrial development programming is a complex field. It encompasses a wide variety of activities, including, among others: evaluation of shortcomings and potentials of existing industries and planned projects; preliminary assessment of new investment opportunities or project ideas; preparation of pre-investment studies of technical requirements, economic feasibility, location and other factors; and evaluation of these studies in terms of implementation priorities and supporting policy measures. UNIDO's new Industrial Feasibility Study Extracts are intended to assist those who are engaged in these activities, by retrieving certain key elements of general reference value from the material being generated and accumulated in the process of industrial project preparation in various developing countries.

A sample of what these extracts will probably look like appears in the appendix at the end of this article. In contrast to UNIDO's *Profiles of Manufacturing Establishments*,<sup>1</sup> which draws upon data obtained from industrial establishments and enterprises already in operation, the extracts will aim at tapping the growing stock of techno-economic feasibility studies on various investment projects now available in industrial banks, development corporations, government planning agencies and international organizations.

## **RAW MATERIAL FOR THE EXTRACTS—GOOD INDUSTRIAL FEASIBILITY STUDIES**

Each extract will be compiled in a standard form established for this purpose. Each of the techno-economic feasibility studies to be selected and digested in this form should be a "good" study, in the sense that:

- (a) It presents a well-designed investment project, properly adapted to conditions in the given developing country or region;
- (b) It makes possible a comprehensive, balanced and thoroughly critical evaluation of the project.

The individual techno-economic feasibility studies, from which the extracts are to be compiled, should in each case be complete in terms of:

<sup>1</sup> Volume I (ID/SER. E/4; Sales No. 67.II.B.17) and Volume II (ID/SER. E/5; Sales No. 68.II.B.13). Volume III (ID/SER. E/6) is now being printed.

- (a) The technical specification of proposed industrial factories (consideration should be given to possible alternative model plants for each prospective field of industry);
- (b) The analysis of the potential cost-price relationships for each factory, anticipated under the local socio-economic conditions;
- (c) The national and regional development policies and measures that are likely to influence the viability of the projects considered.

Such feasibility studies may be distinguished from the so-called "opportunity" studies and "pre-feasibility" studies, which refer to a less advanced stage of project preparation. They also exclude the "blueprint" studies, which are part of the implementation phase of industrial projects.

## **PROBLEMS OF SECRECY AND TYPES OF INDUSTRY TO BE COVERED**

In view of the commercial secrecy clause attached to most feasibility studies, great care will have to be exercised in "neutralizing" the information to be included in the extracts. Ordinarily, countries or institutions involved in the preparation of the original feasibility studies will not be mentioned by name. Even the continent in which the projects under study are to be located may possibly not be divulged.

As regards the types of industry to be covered by the series of extracts, there is some argument in favour of specifying initially only a limited number of industries or types of projects. This approach would permit the selection of two or more directly comparable studies on one type of project, as prepared under different regional constraints. However, the number of candidate industries of great interest to the developing countries is actually quite large, if it is defined in reasonably specific terms. And, since candidate feasibility studies for the extracts are all related to industrial projects that at least at some time have already received serious attention on the part of development institutions in developing countries, it may be advisable not to overemphasize the merits of a rigorous pre-selection of candidate industries.

Investment proposals for steel mills, petroleum refinery complexes, and similar large projects will not be included in the series when there is a danger of disclosing the identity of the projects, that is, when the data cannot be sufficiently "neutralized". Studies that unambiguously reflect some highly unusual circumstances in a given region will also be excluded. Apart from such exceptional cases, the extracts will, as a rule, be open to contributions from all sources relating to any branch of manufacturing industry.

#### NEED FOR ACTIVE PARTICIPATION OF DEVELOPMENT INSTITUTIONS

The extracts approach to feasibility studies has the intrinsic value that it makes information, compiled in a summary form, readily accessible; and it also provides an opportunity to bring together in a comparable form an ever-growing number of investment project studies. These studies, which are currently piling up or being hoarded in a variety of institutions, can be transformed into an on-going series of reference programming data of broad, practical use. It is important, therefore, that the extracts programme receive appropriate support from development institutions and that as many as possible of these institutions that have access to industrial project feasibility studies participate actively in the preparation of extracts.

If appropriate support is forthcoming from the development institutions, UNIDO will be willing to serve as a central clearing-house to:

- (a) Seek relevant kinds of extracts in response to specific requests from developing countries;
- (b) Render assistance to those countries willing to contribute to the extracts by conducting training workshops on industrial project planning;
- (c) Provide such editorial and technical evaluation services as are required to assemble and distribute extracts to registered users;
- (d) Publish selected extracts for general use.

#### MERITS OF THE EXTRACTS APPROACH

Relative to other possible approaches to the complex task of improving the data base for industrial programming, the main merits of the extract approach are as follows:

- (a) It should lead to a better and broader utilization of the scattered, but continually growing, stock of industry studies; without the extracts, the specific use made of each study would be extremely short-lived, despite the high cost of its preparation.
- (b) Compared with conventional "cataloguing", which offers no more than an indexing of materials of relatively unspecified reference value, the extracts will offer substantive reference

material that has already been predigested for a specified, yet fairly broad, range of uses.

- (c) Compared with the conventional "model plant" data, which is concerned only with the "technological norms" for each specified industry, the extracts will make use of the so-called techno-economic feasibility studies, each representing a synthesis of the data on engineering alternatives and the data on local markets and other economic factors.
- (d) Compared with the *Profiles of Manufacturing Establishments*, the extracts have the advantage of utilizing cost-price information, which is more explicitly structured for analytical purposes than the information normally available from the accounting records of operating enterprises; a relative disadvantage of the extracts is, however, that data available at the stage of the feasibility study reflect at best the well-informed imagination of those who prepared the studies. While the profiles can be used as an important part of a diagnostic study on existing industries, which is itself a prerequisite for industrial development planning, the extracts will more likely become an integral part of the UNIDO programme of information and training in industrial project preparation and evaluation.

#### MAIN USES OF THE EXTRACTS

The extracts, compiled and assembled from a variety of sources related to the developing countries, can be used for a variety of purposes connected with industrial development programming. Apart from their potential usefulness for general theoretical purposes, it is anticipated that their primary field uses will be:

- (a) As a reference at the stage where "ideas" for new development projects are being sought, before resources are committed for intensive (and expensive) studies on selected ideas;
- (b) As a comparative reference for evaluating industrial project studies or offers from potential suppliers, with due attention to the possibilities for variations arising with a given type of industrial plant under different market and other regional conditions;
- (c) As a comparative reference for evaluating the performances of existing factories and enterprises.

In addition to various adaptive uses of the substantive contents of each extract, the standardized framework of extracts may in itself serve as a sample term of reference for the preparation of industrial feasibility studies. Also, when it is possible to follow up on a given industrial project, in order to compare pre-

investment estimates with post-investment realities, a combined reference to both the profiles type and the extracts type of information may provide an insight into factors crucial for realistic project programming, helping thereby to upgrade methods of project preparation in general.

#### AN INVITATION TO PARTICIPATE

The utility of the extract approach to obtaining reference programming data depends directly on the scale of collection achieved, and this depends on the co-operation of all agencies interested in the project,

either as suppliers of the necessary inputs or as users of its outputs, or both.

All institutions, private or governmental, that are interested in making contributions to the extracts programme are invited to contact the Industrial Programming Section of the Industrial Policies and Programming Division of UNIDO. If an institution possesses good feasibility studies but lacks the necessary personnel to prepare neutralized extracts from them, they may supply copies of such studies to UNIDO, which will then prepare the extracts. Alternatively, some other form of UNIDO assistance may be arranged.

**PROJECT: PRODUCTION OF FLAT INTERMEDIATES OF ALUMINIUM**  
(Planning year: 1967)

**I. ORIGIN OF THE STUDY**

- This study was prepared by: an independent consulting firm  
for: a national investment bank.
- The study was intended to substitute imports. The production of intermediates of aluminium has been the missing link in the chain of aluminium-based industries in the country. Raw material is available from a local smelter. Finished products, such as roofings, household utensils, building sections, are manufactured from imported intermediates.
- Size of the economy considered:
  - Population (approx.): 8 million
  - Per capita GDP (approx.): 226 US\$
 Other information:

**II. GENERAL DESCRIPTION**

- Products:** Aluminium coils, 0.5 mm thick, with a maximum width of 1,250 mm for the manufacture of roofing sheets, and circles 0.6—1.8 mm thick, with a diameter of 180—900 mm for the manufacture of pots and pans out of "insensitive" aluminium alloys, such as AA 3003 and AA 5005.
- Major input materials:** The plant can use either locally produced aluminium pigs or, if situated near the smelter, molten virgin aluminium.
- Alternative technologies available and technology adopted for the study:** Besides the conventional casting, milling and rolling process, considerations were given to the recently developed strip casting process. A comparative evaluation of different processes was conducted (see *Supplement*), and the Hunter strip casting process was suggested for this project, due to outstanding cost advantages. The range of alloys which can be produced by the Hunter process is, up to now, relatively small, and comprises no products of high-quality requirements. In the cold-rolling and finishing department, the conventional equipment, not highly mechanized, is to be used.
- Locational factors:**
  - Indication of particularly important factors: The value per ton of product is high, but the ratio of value added to the value of production is relatively low. About 6,000 tons of aluminium pigs and 1,500 tons of scrap are to be transported. The total weight of finished products is in the same range. Taking the purchase of molten aluminium into consideration, a location in the direct vicinity of the smelter is advisable to enjoy the maximum cost advantage. For the transportation of molten aluminium, special vehicles are necessary. Large quantities of cooling water are needed in the strip casting process. The actual water consumption is kept low by re-circulating the cooling water.
  - Actually proposed locality: A location in the direct vicinity of the existing smelter is proposed. The area has an additional advantage in that the main customers are situated in the same area.

**III. MARKET**

- Tabulation of estimated demand on domestic and export markets:

Product	Unit	Current annual consumption	Of which imported (%)	Projected demand in 1970	Increase per year (%)
Aluminium roofing sheets	000 tons	5,500	100	6,000	
Galvanized corrugated sheets (substitution product)	000 tons	1,000	100	none	
Aluminium circles	000 tons	900	100	1,000	
Aluminium extrusion products (building sections)	000 tons	310	100		

No export is envisaged.

- Notes on methodology: The main factors influencing the development in demand for aluminium roofing sheets and household utensils are: population development, purchasing power, and scope of substitution of aluminium products for other goods. Political and economic uncertainties lead to the assumption that no essential growth in demand can be expected in the next three years. With favourable economic conditions (increase of number of dwelling houses by 8% per year) the demand could rise to 15,000—20,000 tons by 1980. The demand analysis and projection is based on a fairly detailed market research (field studies, in which all consumers of aluminium intermediate products were contacted).

- Selection of product-mix: The main field of application for aluminium will be: roofing sheets and sidings, household utensils, construction and building sections, packagings like tubes and cans, foils, conduction wires. Flat intermediates form the majority of all aluminium products imported now. The minimum capacity of an extrusion plant, about 1,000 tons per year, does not allow a profitable production of building sections and intermediates for packagings and wire during the next decade. Therefore, the project is designed to produce aluminium coils with a thickness of 0.5 mm to 1.8 mm. Sheets and circles are produced from these coils on separate finishing lines.



## IV. CAPACITY OF PROPOSED PLANT

1. Nominal maximum capacity according to major process: The planned maximum capacity is 30 tons per day of coils in a three-shift operation.
2. Maximum feasible capacity of the plant: The capacity is limited by the Hunter casting machine to 8,000 tons per year. The maximum capacity of all other machinery and equipment ranges from 16,000 to 24,000 tons per year (three-shift operation). An expansion is planned to take place as demand grows. The installation of a second caster would increase the maximum capacity to 16,000 tons of coils per year.
3. Expected maximum output of the plant: The expected maximum output is 88% of maximum feasible capacity.

## V. INVESTMENT (000 US \$)

	Total	Foreign currency component		Total	Foreign currency component
Total investment	7,326	4,656	2. Working capital	1,652	168
1. Fixed assets <sup>1</sup>	4,919	3,955	2.1. Inventories	767	168
1.1. Land, site development <sup>2</sup> (1.3 ha)	23	—	- Production materials, fuels & auxiliary materials (1/2 months)	364	168
1.2. Buildings	995	195	- Parts & supplies for repair & maintenance	—	—
- Factory (4,400 m <sup>2</sup> , \$35/m <sup>3</sup> )	971	190	- Work-in-process	—	—
- Office (110 m <sup>2</sup> , \$45.7/m <sup>2</sup> )	5	1	- Finished goods (1 month)	403	—
- Storage	—	—	2.2. Accounts receivable (2 months)	816	—
- Others	—	—	2.3. Other liquid assets (cash for unforeseeable payments)	69	—
Auxiliary departments (149 m <sup>2</sup> , \$24.7/m <sup>3</sup> )	19	4	3. Other investments	755	533
1.3. Machinery & equipment	3,901	3,760	3.1. Pre-investment costs		
(details see below)			- Preliminary expenditure		
			- Planning costs	158	158
			- Engineering costs during construction	72	44
			- Interest during construction (8% per annum)	364	242
			- Training costs	81	25
			- Others (know-how contract and contingencies)	80	64
			3.2. Start-up expenses		
			- Consultant fees		
			- Costs for test run		
			- Others		

<sup>1</sup> No import duty is calculated on assets. It is assumed that the project is granted exemption from import duty under an investment promotion decree.

<sup>2</sup> No land is sold for industrial sites, rental system.

<sup>3</sup> The auxiliary installations consist of a transformer station 11 KV, 2,500 KVA, fuel oil tank, air compressor, water supply, repair shop and laboratory.

Major machinery & equipment	Installed capacity	f o. b. supplier's port	Transport cost (insurance freight)	Import duty	Landing, local instal- lation cost	Total	Foreign currency component
Melting and holding furnace	40 kW	121	8		19	148	143
Hunter caster complete	70 kW	543	38		87	668	643
Cold rolling plant	1,350 kW	1,040	73		167	1,280	1,232
Stretcher leveller and slitter	290 kW	803	56		129	988	948
Sheet and circle line	70 kW	223	16		36	275	267
Packaging and delivery	35 kW	17	1		3	21	20
Contingencies	—	—	—		—	23	16
Auxiliary installations <sup>3</sup>	190 kW	352	20		52	424	419
Office equipment and other equipment	55 kW	46	2		3	51	50
Transportation facilities	—	18	4		1	23	22

## VI. MANNING TABLE

Total number of persons 123

Shops	1st shift	2nd shift	3rd shift	Shops	1st shift	2nd shift	3rd shift
1. Primary operative shops (including supervisory staff)	43	20	12	2. Auxiliary operative shops	24	—	—
Melting and casting department	11	9	9	- Repair & maintenance	14		
Rolling and heat treatment	9	3	3	- Utilities control			
Finishing department	23	8	—	- Product & material storage			
				- Off-site transport	4		
				- Guards, cleaners, etc.	6		
				3. Administration	24	—	—
				- Production management	4		
				- Research & development	6		
				- Sales & purchase	3		
				- General administration	11		

## VII. ANNUAL PRODUCTION

1. Total annual expected maximum output: \$6,640,000

Product	Unit	Quantity	Domestic sales		Foreign sales	
			Unit price ex factory (US\$)	Annual turnover (000 US\$)	Quantity	Unit price ex factory (US\$) Annual turnover (000 US\$)
Coils for roofing sheets .....	tons	6,000	920 per ton	5,500	No exports foreseen	
Coils for circles <sup>1</sup> .....	tons	1,000	1,000—1,200 per ton	1,140		

<sup>1</sup> For the production of 1,000 tons of circles, 1,500 tons of circle sheets are necessary.

2. Expected sales and inventory build-up:	(000 US\$)	Year of operation			following years
		1st	2nd	3rd	
- Production .....		4,050	5,760	6,640	6,640
- Net inventory accumulation (finished products) .....		282	81	40	—

3. Pricing policy: The c.i.f. prices of imported products are taken as the basis, in which 2.5% landing and handling charges and 20% customs duty are included. If c.i.f. prices plus landing costs, excluding customs duty, were taken as the basis, the annual turnover would fall to \$5,564,000.

4. Planned sales organization: There are only a few main customers for flat intermediates, all located in the same area. Therefore, the sales organization was considered as being a relatively simple matter.

## VIII. ANNUAL OPERATING COSTS AND PROFITS

Cost item	Unit price (US\$)	Quantity	Annual costs (000 US\$)	Foreign currency component (000 US\$)	Cost item	Annual costs (000 US\$)	Foreign currency component (000 US\$)
Total costs (1-8) .....			5,054	618	2. Personnel costs (*) .....	214	49
1. Material costs .....			4,096	569	2.1. Wages & salaries .....	140	49
Raw material					2.2. Contributions to social securities .....	37	
Aluminium pigs tons	551	5,740	3,163		2.3. Fringe benefits .....	37	
Aluminium scrap <sup>1</sup> .....	tons	395	1,440	569	3. Interests (\$1,182,000 at 8.5%) ..	100	
Operating and general supplies .....			67		4. Rents for site <sup>3</sup> .....	3	
Energy costs					5. Indirect taxes at company level <sup>4</sup> ..	—	
Electric energy. Kwh	0.013	5,444,000	71		6. Depreciation <sup>5</sup> .....	350	
Fuel oil .....	tons	80	2,463	197	6.1. Buildings .....	36	
Compressed air. 9 cu.m./min. at 8 atm.			7		6.2. Machinery & equipment (including transportation) .....	274	
Water <sup>2</sup> .....	cu.m.	0.25	88,000	22	6.3. Office equipment .....	13	
					6.4. Other investment .....	27	
					7. Administrative expenses & sales costs .....	84	
					8. Other costs (maintenance, repair and contingencies) <sup>6</sup> .....	207	
					9. Profit before tax .....	1,586	
					of which - profit tax 50% .....	793	
					- subsidies		

<sup>1</sup> In addition there are 1,650 tons re-circulating material at an annual production of 7,000 tons end product.

<sup>2</sup> Cooling water is re-circulated.

<sup>3</sup> Industrial sites are to be rented from a Development Corporation.

<sup>4</sup> Sales tax does not apply to industrial intermediates.

<sup>5</sup> Linear depreciation, in general: 3.5% for buildings and site development; 7% for machinery and equipment and other investment, 25% for factory and office equipment and of vehicles.

<sup>6</sup> In general: 2% of building costs; 5% of investment costs of equipment.

(*) Categories of persons employed	No. of persons	Domestic		Foreign	
		Annual wages & salaries & fringe benefits (000 US\$)	No. of persons	Annual wages & salaries & fringe benefits (000 US\$)	Foreign currency component (000 US\$)
Top managers	2	20	1	25	22
Engineers			2	50	26
Technicians	1	3			
Commercial staff	3	10			
Clerks and typists	10	12			
Foremen	5	11			
Skilled operatives	41	60			
Semi-skilled operatives	20	20			
Unskilled operatives	38	28			
Part-time operatives					
Other special categories					

## IX. FINANCING PROPOSAL (in US\$)

1. Equity capital (total): 3,316,000 (of which foreign currency component: 2,155,000).
2. Long-term loans (total): 1,505,000
  - Rate of interest: 8% per annum
  - Repayment: Over six years, starting in the third year of production.
3. Other loans: —
4. Supplier's credits: 2,321,000, of which foreign currency component: 2,321,000. Assumes a machine supplier's credit 70% of the c.i.f. value of the production machinery. The remaining 30% is paid as follows: 10% cash down when ordering, 10% upon delivery, 10% when machinery is ready for operation.
5. Remarks on the financing policy: This is only a crude financing proposal.

## X. IMPLEMENTATION PLAN

1. Technical collaboration service: Technical collaboration with the patent owner, the Humer Engineering Corp. USA, is indispensable. The costs of a know-how contract are estimated at \$64,000.
2. Project management: No special project management is envisaged. The technical supervision and control of the construction are to be handled by the collaborating foreign corporation.
3. Recruitment and training of personnel: Three expatriates will run the company. One supervisor and three foremen will be trained abroad for up to a one-and-a-half year period. The costs of this programme are estimated at \$25,000. But due to the sophisticated production technique, the expatriates should not be replaced by domestic staff in the first years of production.
4. Other items:
5. Time schedule: For the realization of the project a total period of 30 months will be necessary: i.e.
  - Planning and awarding of contract ..... 9 months
  - Construction period, buildings, simultaneous delivery and shipping of machines. 14 months
  - Assembly of machines and test runs ..... 7 months
 Extension phase: An extension of the casting capacity is possible without disturbing the production flow ("building block" system). The timing of the extension phase depends on the growth of demand.

## XI. DATA FOR EVALUATION

1. Profitability evaluation:
  - Check:
  - (x) Break-even point analysis
  - ( ) Return to total capital
  - ( ) Pay back
  - (x) Rentability: return to equity capital
2. Further profitability analysis for given project life (Bankability test):
  - Check:
  - ( ) Internal rate of return
  - ( ) Net present value
  - ( ) Any other method used
3. National economic benefit-cost analysis (National priority test):
  - Check:
  - (x) Direct value added and employment effects
  - (x) Balance of payment effect
  - (x) Social marginal productivity of capital
  - (x) Backward and forward effects
  - ( ) Synthetic benefit cost analysis
  - ( ) Any other method used

Give a short outline of the methods used and major findings:

**Break-even point analysis:** The fixed costs of \$1,054,000 consist of indirect labour, administrative, selling and general expenses, maintenance and repair, depreciation and interest. The variable costs at full production (7,000 tons) of \$4,156,000 include direct labour, materials and supplies. An allowance for contingencies of 5% is added. The prices for finished products are \$920 per ton for sheets and \$1,115 per ton on average for circles. A constant proportion of output of sheets and circles is assumed at all degrees of capacity utilization. Thus the break-even point lies at an annual production of 2,900 tons of roofing coils and 500 tons of circles, i.e. 49% of maximum feasible capacity. The possibility of cost reduction by buying molten aluminium is not taken into consideration in this calculation.

**Rentability: return to equity capital:** Assuming a tax holiday of five years, the yield on equity capital is in the first year of operation 8%, in the second year 27%, in the third year 37%, in the long run 22% on an average.

**Direct value added and employment effects:** The net value added at factor costs amounts to \$1,900,000, i.e. wages and salaries \$214,000, interest \$100,000, profit before taxes \$1,586,000. The project provides work for 120 domestic employees, 38 of which are unskilled and 20 of which are semi-skilled.

**Balance of payment effect:** The savings per annum from the substitution of imports of aluminium semi-processed products amount to some \$6,000,000 (c.i.f. value), after deduction of the exchange expenses for the import of scrap (\$569,000) and for the salaries of the European management (\$49,000). The net savings will be reduced by some \$550,000 if the transfer of profit of a foreign partner holding 65% of the equity capital (\$484,000) is taken into account.

**Social marginal productivity of capital:** Each \$100 of capital investment creates \$25 of additional domestic income from profit, taxes and wages and salaries, excluding the salary of the European management staff.

**Backward and forward effects:** The aluminium semi-processing plant closes the gap between the production of raw aluminium and the manufacturing of finished goods.

## XII. SUPPLEMENT

## 11.3 Comparison of Processes

## a) From the technological standpoint

During the last few years, strip casting processes have been developed. These processes are especially suitable for the manufacture of semi-finished goods of insensitive aluminium alloys (restricted solidification range, particularly low-alloyed Al). For the comparison, the Hazelett Casting Process and the Hunter Engineering Process were selected as the unconventional processes. Cold-rolled coils and sheets of casted strips produced by the two processes are generally used for the following purposes:

Deep-drawing products: household utensils, cans  
 Building materials: roofing sheets, sidings, frames, ventilating pipes  
 Miscellaneous: painted sheets, packagings, welded pipes for irrigation purposes, foils.

In all cases the requirements in terms of the product quality are not very high. Anodizing is possible, but with some difficulty, since unavoidable surface irregularities which occur during casting impair the surface quality of the end product.

## b) From the economic standpoint

In order to determine the most favourable process, the comparison of processes was based on the expected demand in 1980 of approximately 17,000 t flat intermediates.<sup>1</sup> The costs, more or less invariable for all the three processes, were left out of consideration. The conventional process involves very high investment and operating costs but offers the advantage of a versatile production programme. The Hunter Engineering Process seems the most profitable solution since, in the case presented, the demand is limited to few Al-alloys with no special quality requirements and there is a clear cost advantage.

Comparison of Investment Costs (fixed assets) and Conversion Costs in 000 US \$

Process	Type of investment	Raw Material and Heating			
		1. Raw material Al pigs and scrap		1. Raw material molten Al	
		2. Furnace electric	oil	2. Furnace electric	oil
1. Conventional	Technical equipment	5,750	5,430	5,050	
	Buildings <sup>2</sup>	2,200	2,200	2,050	
<b>Total</b>		<b>7,950</b>	<b>7,630</b>	<b>7,100</b>	
Conversion costs ct/kg		11.8	13.2 <sup>3</sup>	1.5	
2. Hunter Engineering	Technical equipment		4,380		4,250
	Buildings <sup>2</sup>		1,400		1,300
<b>Total</b>			<b>5,780</b>		<b>5,550</b>
Conversion costs ct/kg			10.3		8.0
3. Hazelett Casting	Technical equipment		5,850		5,650
	Buildings <sup>2</sup>		1,200		1,130
<b>Total</b>			<b>7,050</b>		<b>6,780</b>
Conversion costs ct/kg			.. <sup>4</sup>		.. <sup>4</sup>

<sup>1</sup> Assuming favourable economic conditions, among others a growth rate of the number of dwelling houses of 8% per year.

<sup>2</sup> The costs of the buildings are based on a price of \$35.3/m<sup>3</sup> and a hall height of 6 m. Only the space required for the production plant was taken into consideration.

<sup>3</sup> The local price for fuel oil far exceeds the world market price; otherwise the conversion costs would be 11.8 ct/kg.

<sup>4</sup> Since the plant for the Hazelett Process is intended for mass production only, 25% of its capacity is utilized by the production volume used in the comparison. The investment costs alone are thus so high that the process can be excluded from further comparison.

XIII. CASH FLOW TABLE (000 US\$)	Construction year			Production year								Terminal value of assets
	1st	2nd	3rd (half)	1st	2nd	3rd	4th	5th	6th	7th	8th	
A. Source of cash	3,316	—	3,826	3,718	5,679	6,640	6,640	6,640	6,640	6,640	6,640	
1. Financial resources:												
total	3,316	—	3,826	—	—	—	—	—	—	—	—	
1.1. Loan <sup>1</sup>			1,505									
1.2. Equity	3,316											
1.3. Suppliers' credits			2,321									
1.4. Subsidies												
2. Sales revenue: <sup>2</sup>				3,718	5,679	6,640	6,640	6,640	6,640	6,640	6,640	
B. Uses of cash	792	1,640	4,244	3,684	5,795	6,530	6,357	5,521	5,778	5,778	5,835	
1. Fixed capital expenditure:												
total	424	1,464	3,031	—	—	—	—	76	—	—	76	(2,180)
1.1. Land, site improvements & buildings	104	914										( 677)
1.2. Machinery & equipment (new installation)	320	550	3,031									(1,250)
1.3. Machinery & equipment (replacement)								76			76	( 38)
2. Net working capital:												
total	—	—	947	287	352	176	—	—	—	—	—	(1,762)
2.1. Stocks of materials			250	5	73	36						( 364)
2.2. Work-in-process <sup>3</sup>												( —)
2.3. Stocks of finished products				282	81	40						( 403)
3. Pre-investment & start-up expenses: <sup>4</sup>	368	176	798	—	198	100	—	—	—	—	—	(1,210)
4. Production expenditure:												
total				3,080	4,248	4,787	4,787	4,787	4,787	4,787	4,787	
4.1. Personnel expenditure				214	214	214	214	214	214	214	214	
4.2. Materials <sup>5</sup>				2,469	3,568	4,096	4,096	4,096	4,096	4,096	4,096	
4.3. Administrative expenditure				105	105	105	105	105	105	105	105	
4.4. Indirect taxes & royalties												
4.5. Other expenditure (outside repair works) (contingencies)				112	112	112	112	112	112	112	112	
4.5. Other expenditure (contingencies)				180	231	260	260	260	260	260	260	
5. Debt service:												
total	—	—	159	317	1,029	1,235	1,235	326	326	326	307	
5.1. Interest on loans			159	317	317	257	175	86	66	45	21	
5.2. Repayment of loans & credits				712	978	1,060	240	260	281	286	286	
6. Dividends & profit <sup>6</sup> taxes paid:	—	—	—	—	166	332	332	332	665	665	665	
C. Surplus/Deficit (A—B)	2,524	—1,640	—418	34	—116	110	273	1,119	862	862	805	
Surplus/Deficit accumulated:	2,524	884	466	500	384	494	767	1,886	2,748	3,610	4,415	

- 1 Loans of different terms should be shown separately.
- 2 Annual value of production of finished goods minus annual accumulation of finished goods inventory.
- 3 Total production costs minus production costs of finished goods.
- 4 Not including interest during construction.
- 5 Annual purchase minus annual accumulation of materials inventory.
- 6 This item stands for the part of profit which is to be paid out, namely profit tax, dividends, fees of the members of the executive board, managerial staff's share in profits, etc. Actually this sum will be established after allowances have been made for depreciation which are not included under item 4 (production expenditure). The cash flow balance should be programmed, therefore, in such a way that all necessary replacement (B.1.3.) can be covered in any year by the accumulated surplus.

Comments:

# Checklist of concepts and problems in industrial planning\*

Planners and consultants in the developing countries are continually faced with the need to produce quickly tentative proposals for industrial development. This emphasis on speed, coupled with the chronic shortage of experienced personnel, puts a premium on tools that can be used to aid the planner in this task.

As a partial, modest response to this need, this article presents a checklist of concepts and problems that a planner may wish to consider in formulating recommendations for industrial development strategy, plans and programmes, and implementation schemes for a particular country. This checklist is intended to stimulate ideas. Not all of them will be important to a particular country. Furthermore, their relative importance will vary from country to country. It is up to the individual planner to determine which of these or any other concepts or problems he may need to consider seriously.

For convenience, the concepts and problems have been grouped into the following six general categories:

- (a) Industrial strategy;
- (b) The role of government and institutions;
- (c) Foreign markets, imported technology, and foreign aid;
- (d) Planning;
- (e) Planning for implementation;
- (f) Foreign investment and imports.

## *Industrial strategy*

Industrial strategy usually deals with major long-term measures envisioned to provide a general framework for the relatively flexible planning of short- and medium-term development. The importance of this framework is attested to by the following list of concepts and problems that may be considered in dealing with it:

The essentially long-term nature of a strategy, owing to the long-term courses of action to which it usually commits the country's Government, its people, and its resources, should be recognized.

Plans and policies should not be confused with strategy; attempts to make them serve as substitutes

for a well-thought-out basic strategy should be avoided.

The proper role and proportion of industrial development will vary from one developing country to another and can best be determined separately for each country.

Industrial development exerts a heavy influence (compared with its proportion of GDP) on the whole development strategy of a country.

Sometimes the attempt is made to achieve occasional leaps forward in industrial development, instead of pursuing a continuing development at a slower rate.

It should be recognized that industrial development must share in the allocation of funds and other resources with the development of infrastructure and agriculture and the development of mineral exports, including petroleum.

It is important to capture the popular imagination with the industrial development programme, in order to gain active support for it.

Determination of strategy for development cannot be based solely upon the mathematical weighting and aggregation of the proposed development of individual sectors, owing to the arbitrariness of weight assignment. Less formalized and more direct methods of arbitrating the final sectoral mix on which the development strategy is to be based, are usually preferable.

Since development plans must serve multiple purposes, no single purpose in them can be optimized, although suboptimizations are often feasible and useful.

Some objectives are essentially contradictory, such as maximizing productivity and minimizing un-

\* UNIDO has repeatedly received requests from planners in developing countries for a list of concepts and problems that would stimulate their creative thinking on industrial strategy, planning, and implementation issues. In partial response to these requests, several lists of concepts and problems are presented in this article. The lists were compiled by the UNIDO secretariat, but each list draws heavily upon the thinking of consultants and planners from both the developing and the developed countries.

employment at the same time; what is called for is something of a compromise.

There is usually constant opposition between short-term and long-term objectives. High investment for greater long-term growth comes at the expense of short-term production for immediate consumption or consumption of imports.

A strategy that forces an "either . . . or" choice (a dichotomic choice) between developing one major part of the economy, such as infrastructure, and another, such as industry, should be avoided. What is needed is an intelligent blending of the development of various areas. Some of the other areas in which it is important to avoid a dichotomic choice are:

- (a) Export promotion versus import substitution;
- (b) Heavy industry versus light industry;
- (c) Cash crops versus subsistence agriculture;
- (d) Balanced versus unbalanced economic growth.

Alternative industrial strategies should be developed so that the "best" of several may be selected, or so that the selected strategy can be more easily changed if it becomes desirable to do so. These alternative strategies can be developed by:

- (a) Varying the goal mix;
- (b) Varying the policies adopted;
- (c) Comparing different sequences of arriving at the same results after a given period.

Industries that are likely to yield the highest returns in terms of satisfying some of the goals should be identified. This will be a trial and re-trial iteration process.

Strategy should be based on an extensive analysis of all relevant information and the examination of various alternatives—rather than solely on the character of an industry or on an average development pattern in a number of countries, established by regression analysis.

Prospective industries should be roughly classified into supply-determined industries (natural resource and power-oriented) and demand-determined industries, in order to focus attention on the limits to their rate of expansion.

Possession of rich mineral resources does not necessarily make a country potentially rich—extraction costs, transport costs, and the high capital investment required to process them often prevent their economic exploitation.

A choice may have to be made between capital-intensive and labour-intensive techniques of production.

The size of the domestic market for industrial products cannot usually be measured by *per capita* income or GDP; instead, the distribution of the country's income needs to be taken into account.

Human resources usually suffer from a shortage of

the needed skills, too rapid a pace of urbanization without corresponding supporting industrialization, and a rigid social stratification. These impose rather severe restraints on the development strategy.

An adequate supply of spare parts and skilled repairmen to maintain continuous output in the industries by preventing costly shutdowns must be assured.

#### *The role of government and institutions*

The role of government and institutions focuses upon the continuing need to design policies and establish new institutions specifically to support selected industrial development strategies and plans. In doing this, consideration may be given to the following concepts and problems:

Society's general long-range objectives should be clarified. Industrialization is not an aim in itself but is rather a means to achieve desired economic progress and social welfare.

The need for an industrial development strategy and for close co-operation between the planners and the framers of the strategy should be recognized.

Because of growing demographic pressures (high rate of increase of population), there is a need to industrialize at a greater rate.

In most developing countries the development strategy for industry should be closely tied to those for agriculture, institutions and infrastructure.

The country's policies that bear on development need to be continually revised.

What responsibility the public, the co-operative, and the private sectors will have in furthering industrial development must be determined.

Controls may be needed on the allocation of scarce resources.

Fiscal, income, and pricing policies may need to be revised to allow or encourage the desired industrial development.

Some restriction may need to be placed on the expansion of industries producing luxury goods and some limit placed on the import of such goods in order to release resources for expansion of industries producing the "essentials".

The future drain of capital out of the country to service foreign debts may be overlooked when foreign loans are contracted or foreign investment to develop the country's industry is welcomed.

Industries that will replenish the foreign exchange they initially require by contributing to the country's exports or reducing its imports should be promoted.

Sufficient import capacity or foreign aid or foreign loans to overcome the country's deficit in the supply of raw materials, intermediate goods, equipment, consumer goods, management know-how, or skilled manpower services should be available. If the capacity is inadequate, ways will have to be sought to increase

it, or the industrial development programme will be restricted.

New special financing institutions may have to be established to loan, or otherwise provide, the initial capital and continuing working capital needed by industry.

Certain projects should be chosen for location in particular areas of the country with the aim of reducing regional inequalities.

A government-supported programme of research and development on specific industrial problems of the country should be considered.

#### *Foreign markets, imported technology and foreign aid*

Some of the problems and concepts related to foreign markets, imported technology, and foreign aid for industrial development are:

The question of access to foreign markets for exportable raw materials brings up the problem of how much value to add to the raw materials before exporting them.

Access to foreign markets is not simply a matter of producing competitively or of subsidizing exports, but also involves imaginative trade policies to penetrate areas already dominated by large vested interests.

Foreign aid may sometimes be allowed to dominate a country's industrial development strategy, when the country's strategy should actually determine the foreign aid projects.

Technological and technical problems often arise from the dependent position of developing countries with respect to what is offered or sold to them by the developed countries; what is offered is not always the best and in some cases is very unsuitable for economic use in the developing country. Problems also arise from the direct transfer of advanced technology from the developed countries without sufficient adaptation or modification. Special conditions existing in the developing countries, which should be used to advantage, are ignored.

#### *Planning*

Only a few of the concepts and problems related to the planning of industrial development can be included in the following list:

Too great a pressure may be brought to bear on the planning group, with the result that politically popular investment projects, inadequately supported by economic analysis or comparison with other possible projects, are selected.

Personnel capable of adequately evaluating preliminary feasibility studies is lacking.

The lack of feasibility studies in connexion with plans and planning leaves the planner with only

tentative choices of general options and too few specific projects.

Different criteria are used to select different investment projects, rather than common criteria and common accounting values, which permit a more valid comparison to be made of the contribution of the various projects.

A propensity to build large plants in order to impress people with something spectacular is sometimes encountered.

New plants are constructed when the same results could be achieved by expanding or modernizing existing plants.

Unnecessary investment is made in industrial construction, when it would be possible to leave the installation without protective cover or with only a light shelter.

#### *Planning for implementation*

Planning for implementation is increasingly being recognized as an important part of industrial development planning. Some problems and concepts related to this area include:

Thinking of planning and plan implementation as two distinct processes rather than as a continuous process leads to poor planning and uneconomical allocation of resources.

Planning that gives little or no attention to the implementation phase often leads to a significant gap between planned results and economies and those actually realized.

In order to achieve the "best" use of available investment resources and at the same time to reduce inflationary pressures, the plan should include sufficient inducements and controls to encourage investment in the desired industries and discourage investment in the less essential industries, or investment abroad.

Failure to take into account during the planning stage the demands that the planned industrial projects will place on infrastructure, the country's supply of skilled personnel, and its capacity to import leads to delays in project implementation and interference with the operation of existing industry.

Planning the implementation of too many projects at the same time results in too much competition for material, equipment, skills, imports and money.

Projects planned using only one set of key variables are not flexible enough to survive changing or unforeseen conditions. Each project should be planned with at least two variations of one or more key variables (those most likely to change at the time of implementation), such as capital intensity or the minimum economic size of the production unit or the import content.



Lack of foreign exchange to finance the import content of the planned investment programme may arise from unforeseen changes in the balance-of-payments position owing to such things as adverse shifts in terms of trade, emergency imports of food, and failure to attract foreign capital at the planned rate.

Insufficient allowance may be made at the planning stage for increases in project capital costs caused by unforeseen delays. These automatically increase the capital-to-output ratio of the project.

Inadequate allowance may be made at the planning stage for probable delays in project implementation caused by organizational difficulties, transport bottlenecks, and inadequate time-scheduling of material and equipment deliveries or for possible delays in project implementation caused by bad weather.

#### *Foreign investment and imports*

Both foreign investment and imports should receive adequate attention in planning industrial growth. Some important concepts and problems in these areas are:

Lack of control over the flow of foreign investment into industrial projects results in a pattern of investment in conflict with the planned or desired pattern, in an unproductive competition with already established local plants, and in a wasteful (from the

developing country's point of view) use of foreign capital.

Too much emphasis on direct foreign investment in industrial projects and too little on foreign loans results in too great a long-term outflow of funds and adds to the balance-of-payments problem.

Importing capital goods for new plants is unwise when the foreign exchange could better be used to import essential replacement parts for existing plants.

Purchase of foreign know-how and specialists' services as part of an industrial plant package contract is inadvisable when they could be purchased at less cost if purchased separately from capital equipment.

Opportunities to minimize the import content of the project and to give preference to imports payable in soft currency may be missed. If planners are imaginative, they can find ways to use local materials and skills in constructing a plant instead of relying heavily on imported materials and skills. This would add to local employment during the construction period and should reduce import requirements as well as costs, provided that sufficient attention is paid to the use of more labour-intensive (less capital-intensive) methods of constructing the plant.

The lists of concepts and problems presented in this article are by no means complete, nor are they intended to be. Rather, they are presented to stimulate the planner's thinking and to give him at least a start on planning in these areas.

# *Planning the implementation of industrial projects\**

This article deals primarily with industrial project implementation in mixed economies and assumes an economic system that allows industries to be created and conducted either by the public sector or by the private sector. Inasmuch as the main focus of the article is on public-sector activity, many of the ideas brought out should be useful to countries with centrally planned economies.

## ESSENTIALS OF SUCCESSFUL IMPLEMENTATION

The aims of planning, the methods used to formulate and implement industrial development plans and programmes, and the results, are closely related to a country's political, economic and social values as well as to its level of development. Since these values and levels vary from one country to another, the results and repercussions of development planning in one country may well differ from those in another even though both have adopted similar methods.

In spite of the differences between countries, however, the growing body of experience contains lessons that are relevant to all countries. One striking lesson is that planning by itself does not produce development. Developing countries have devoted a good deal of thought, energy and expertise to achieving comprehensiveness, consistency and precision in planning their industrial and economic development, but have not devoted similar efforts to implementation. The formulation of a development plan or programme has often become an end in itself. Failure to achieve the intended development has frequently been attributed to shortcomings in planning techniques, whereas the real shortcoming has often been a failure to achieve successful, or even satisfactory, implementation. Careful planning when not promptly followed by well-organized implementation is like window-shopping: it may be pleasurable to the performer and give rise to attractive fantasies, but its practical effect may be negligible. This is true even when the planners go beyond aggregate planning to commission feasibility studies and evaluations of a number of projects. Although a step

forward, the feasibility study still leaves the customer at the window-shopping stage: an estimated price has been put on the delectable merchandise, and the delights to be expected from its ownership have been elaborated, but actual ownership still remains no more than an aspiration.

Industrial development should be viewed as a continuous activity, of which the plan or programme is only the beginning. The momentum must be maintained through all stages: programming of industrial development; setting of implementation policy; the creation of an organization for implementation; carrying out of feasibility studies; formulation and evaluation of projects; and finally the execution of projects, leading to project operation over a period of many years. The completion of one stage, e.g. the planning stage or the feasibility study, should not be regarded as a point at which to sit back and rest, but only as the starting point for the next stage. In fact, however, this is not the course of action followed in many countries.

In implementing industrial projects, developing countries encounter various economic, technical, administrative or managerial shortcomings. Therefore, the use of sound policy measures, appropriate institutions and an effective communications system linking all the elements in the system of implementation with the controlling authority are prerequisites for successful implementation. The following paragraphs will deal briefly with these important elements.

\* This article is taken from a collection of materials that have been repeatedly used for briefing and training purposes in UNIDO advisory missions and training workshops on project implementation. During these workshops and missions, officials from the developing countries have frequently requested UNIDO to make the materials more accessible to all consultants and advisers on industrial development planning and implementation. In response to these requests, one of the documents from the workshop material on the implementation of industrial projects is presented in this article. This document was prepared by B. BERKOFF of the Commonwealth Development Finance Company in London in co-operation with the UNIDO secretariat.

### *Some common shortfalls of implementation*

It may be useful to list some of the principal obstacles to successful implementation in developing countries. Some are created by the Government itself through its failure to realize the need for continuous planning and action. Although these obstacles can be observed in all types of development programmes, they are particularly acute in the implementation of industrial projects because of the importance of these projects and their capital intensity.

### *Problems of planning as obstacles to effective implementation*

While this article is concerned with the implementation of industrial development projects, and the problems of planning are formally outside its scope, it must be recognized that project implementation is frequently impeded by shortcomings in planning. The most common of these are:

- (a) Failure to take into account the inherent administrative, managerial, institutional, financial, political and social limitations on the country's growth potential;
- (b) Concentration on the largely macroeconomic framework for the development programme, dealing with aggregates based on broad generalizations (such as over-all capital-output ratios) while not providing a framework for the translation of sectoral plans into individual projects;
- (c) Inconsistencies in industrial development programmes, which may lead to targets that cannot be implemented.

### *Inadequate project evaluation*

The lack of proper project evaluation usually results in wrong estimates of costs and inaccuracies in estimates of resources required.

### *Inadequate administrative, organizational and managerial capacity*

For any or all of the reasons mentioned, the administrative organization of the Government may be weak with respect to industrial project planning, and structural reforms may be necessary before the country can measure up to the demands of its industrialization programmes. This may also be true for managerial competence.

### *Excessive governmental interference with private enterprise*

Excessive direct intervention of the Government in business affairs should be avoided especially if it is non-economic, since it may discourage the growth

of the private sector of the economy. Indirect government influence on the general setting in which the private enterprise operates is nevertheless possible through fiscal and monetary policy.

### *Pitfalls encountered in implementation by public enterprise*

Unfortunately, as has been evident, industrial projects implemented under the control of the Government are often subject to a complex of mutually contradictory objectives and considerations. Interference by politicians may be due to their belief that such enterprises can be used as a means of doing many things for many people; such attempts to achieve conflicting objectives usually preclude the possibility of concentration on making the venture economically successful. Moreover, treating industrial projects as part of the governmental administrative system may retard their implementation. If government officials are slow in making decisions concerning a project, adhere too closely to the original plans, and do not allow sufficiently for changes in circumstances, the result may be confusion, delay and high costs.

### *Ineffective techniques for programming and control of project implementation*

The implementation of industrialization projects should be flexible. For the most part, the developing countries do not recognize project implementation as a dynamic process, which is often more intricate in content and structure than the preparation of the development plan or programme itself. No effective techniques are available in most developing countries to enable them to analyse the problems encountered in implementing industrial projects, i.e. to ensure the timely detection of bottlenecks such as delays or shortages in supplies, manpower, capital and equipment; to co-ordinate the execution of dependent projects; and to allocate scarce resources. Nor are there adequate control systems to feed back actual performance results, to evaluate and revise policies as necessary, to re-allocate available resources and update plans of implementation.

### *Essential measures for effective implementation*

It follows from this brief survey of common problems that, to be realistic, planning for industrial development must take proper account of a country's economic, political and social level of development and its administrative and managerial structure. It also follows that the Government should take steps to secure effective implementation. To this end, it should consider a combination of carefully devised policy measures (a discussion of which is beyond the scope of this

article), the creation of an effective institutional framework, and organized implementation and control methods. The principles governing the creation and operation of institutions for industrial development are discussed later on in this article.

It is of primary importance to create effective institutions with competent management, and to delegate adequate powers and authority to them. Because the forces affecting industrial development are complex, no institution can function in a vacuum but must have support and willing co-operation at all levels of the Government. This is likely to be achieved only if there is effective communication within the Government so that the officials concerned are conversant with industrial policy and participate in the formulation of the industrial development programme; in this way they become involved and recognize that the programme targets affecting them may be of their own creation and arise out of work they have done. It should be the aim of the planners and policy-makers to secure such involvement at all levels, from ministers down to junior officials. They should also seek to educate the Government to negate the assumption that once a development programme has been formulated, the Government has done all that it need do. There must be effective implementing institutions enjoying the support and co-operation of the Government, and the Government must always be ready to consider new circumstances encountered in practice and to make any changes in policy and provide any governmental action that may be required.

Administrative and organizational links between the implementing institutions must be created, as well as between them and the Government. This may entail changes within the government administration which will usually be best formulated by policy-makers through consultation with industrial planners and administrators or specialists in public administration. The policy-makers would have to decide *inter alia* whether to endeavour to make a comprehensive reform at the outset or to proceed gradually. Such changes would involve designating the departments and persons responsible for project implementation and fixing their responsibilities and authority.

It may also be necessary to make a study of the government administration to identify weaknesses or shortcomings that may impede the work of implementation, to ascertain the causes and to formulate remedial action. This examination may reveal that the intended development is, in fact, too ambitious even after all practicable improvements have been made in the administrative structure. If so, it will be necessary to adopt more realistic targets. Hence, it is important to study the administrative organization and to formulate all necessary changes in it at an early stage in the planning process.

## THE IMPLEMENTATION OF INDIVIDUAL PROJECTS

### *Government institutions and agencies for implementation*

In sponsoring projects, the Government has usually two principal objectives:

- (a) Each project should be effectively implemented and should succeed in reaching its direct objective—generally the production of certain goods or services in as economical a manner as possible;
- (b) The project should take its proper place within the broader framework of the Government's development programme.

Since many of the factors affecting industry are susceptible to quick, important change, considerable flexibility must be built into an industrial development programme. The system set up for implementation should ensure that overenthusiastic or single-minded departments do not attempt to direct the project management in too great detail, proffering too frequent advice or demanding too much information.

The problem is in effect the familiar one of finding the proper balance between centralization and decentralization: how to give the management of a public-sector project the freedom to take quick, firm decisions in response to changing business conditions, while at the same time protecting the position and interests of the public sector in matters affecting the direction, content, duration, cost, termination and other broad policy aspects of the project. While the needs and problems of each project must be suitably represented to the Government, an effective filter must be created to protect the project from government involvement in its control and management.

### *Institutions for implementation*

Thus, a hierarchy may be visualized, with the Government at the head, the individual projects at the base and specialized institutions in between, each element being responsible to the element above it. The proper balance between centralization and decentralization may be attained by putting project management immediately under the surveillance of an institution in the hierarchy that is itself either insulated from the pressures referred to above or that is capable of absorbing those pressures and passing on to the project only business-like directives consistent with the project's basic aims and with management's operational autonomy. This may be achieved if such an institution is not part of a government department and its only responsibility is to ensure the success of some part (or the whole) of the industrial plan or programme. This kind of institution, which will be referred to in this article as a development agency, may be directly responsible to a ministry (e.g. the

Ministry of Industry or Development) or to a regional or national planning commission.

The development agency may take a variety of forms. It may be a purely promotional organization, with little finance of its own; or it may be both promotional and financial. It may maintain a staff from which the management of projects can be drawn, or it may seek all echelons of management from outside. It may be charged with the industrial development of a specified geographical area or of a single industrial sector. A few named projects may be under its jurisdiction or only a single large one. It may combine the duties of promotion and implementation with those of a development bank; it may even be a development bank that the Government uses as a control agency. The possibilities are manifold, and only a knowledge of the political, historical, social and financial circumstances in a particular country can ensure that the right form of development agency will be chosen for the country. A few considerations may, however, be presented here:

- (a) The staff of a development agency must be fully acquainted with, and geared to further, the Government's long-term policies and intentions (which should be clearly stated in the plan or programme); at the same time, the staff must have an understanding of the business world and its dynamism, and of the way industrial management is conducted.
- (b) To fulfil the functions mentioned so far, and to feed back information derived from practical experience into the implementation system and the planning organization, the framework of the implementation system will require the following:
  - (i) A clear definition of goals, responsibilities and authority of each element in the system, and qualified personnel in each of them;
  - (ii) The drafting by each element in the system, for its own guidance, of an effective implementation plan, taking into consideration its resources and the targets laid down for it;
  - (iii) The collection, processing and dissemination of information about the performance of each part of the system and flexibility in relation to objectives.

#### *Definition of objectives*

Unless clear objectives are laid down for each element in the implementation hierarchy, confusion and vacillation are almost inevitable. While each element should be left free to choose the method of performing its stated task within the limits and resources laid down for it, the nature of its task and the limits of its power

and authority need to be clearly understood by all concerned. It may be of interest at this point to note a list of the "seven deadly sins of public enterprise in developing nations", as spelled out by H. Seidman:

1. Uneconomic and largely unplanned growth;
2. Sacrifice of long-run economic advantages to short-run political and social gains;
3. A bewildering and complex variety of forms of ownership, control and organization with no logical and orderly pattern for their use;
4. Excessive control of administrative and fiscal minutiae and almost complete license with respect to major matters of public policy;
5. Confused lines of authority and responsibility;
6. The 'blight of perpetual inspection';
7. Shortages of skilled managers and excessive rates of turnover in key posts.<sup>1</sup>

The objectives to be laid down for higher elements in the hierarchy will cover a wider field. They will be broader in scope and apply to a longer time span than those for the lower elements of the hierarchy. As an example, an agency concerned with industrial planning may be given:

- (a) A broad definition of the field for which it is responsible;
- (b) Figures for targeted output in various fields; for instance, over a five-year period;
- (c) The global capital and other resources available;
- (d) The principal lines of policy and the priority to be accorded to different objectives: improvement of the balance of payments, preserving the balance of regional development, diversification of industry, preference to certain industries, creation of employment etc.;
- (e) The policy measures necessary to secure successful implementation, e.g. curbs on consumption, tax incentives for selected industries, export bonuses, assurances to foreign entrepreneurs or investors etc.

Such an agency will prepare a plan for giving effect to those objectives and allocate the resources at its disposal among the agencies to which it is authorized to delegate responsibility for implementation.

Below this planning agency, the hierarchy may include one or more development agencies responsible not for general industrial strategy but for setting up and controlling a group of projects. To enable a development agency to perform such functions effectively and in the right relationship to the rest of the planning system, it must receive a clear statement of its operational responsibilities, including such matters as the following:

- (a) The industries or groups of industries under its jurisdiction;
- (b) The principal objectives it has to achieve, e.g. the development of capital goods industries,

<sup>1</sup> *International Development 1965*, Oceana Publications Inc., p. 96, New York.

agricultural processing industries or consumer goods industries;

- (c) The targeted output for each industry in terms of cash generation and/or in terms of the rate of return on invested capital;
- (d) The amount of capital and other resources available, and government policy (if any) with respect to the division of capital and other resources among the different industries or objectives;
- (e) The degree to which the development agency is free to supplement capital by raising funds from non-government sources including foreign sources;
- (f) Whether the agency must always have control or may accept a minority position; and whether this is to apply to all or only some industries;
- (g) Guidelines on the nationality of partners in projects etc.;
- (h) The departments the agency is to consult with and report to, and the degree to which any of them will be authorized to give directives to the agency.

These policies and objectives should be established in close consultation with the development agency. The agency's constitution or terms of reference may be framed so as to give it a measure of flexibility. Thus, the figures for targeted output and available resources may include some element of approximation within which the agency is free to manoeuvre. The policies and objectives may also prescribe that, apart from the control that it has over business under the general law of the country, no department will be authorized to give directives to any project or sub-project under the control of the development agency, and communications from the departments may be addressed to the development agency itself. The scope within which each department can give directives to the agency may also be prescribed; as a general rule, all such directives, from whatever department, should be concerned only with questions of broad policy. The development agency should be entirely free to decide how such broad directives are to be translated into directives to the project.

The development agency may thereupon prepare a master plan for the industries under its control, taking into consideration national objectives, available resources and the like. On the basis of this master plan, the development agency may draw up the objectives of each project (probably in consultation with other participants in the project and certainly in consultation with the management of the project). These objectives will be more limited and more precise than those laid down for the development agency. In general, they may be derived from the feasibility study, the most important elements of which are: what is to be manu-

factured, the targeted annual production, the process to be used, the factory location, and the necessary provisions for effective implementation. The provisions for implementation may contain the following:

- (a) The capital available (which may include a financing plan involving outside financiers);
- (b) Directives on the raising of working capital etc. from banks, or any long-term capital still required;
- (c) Pricing policy;
- (d) Policy on interrelationships with other projects, e.g. where one project is intended to buy products from another, train its staff or labour, share facilities etc.;
- (e) Policy on management—employment of expatriates, training schemes etc.
- (f) Directives on financial policy, payment for foreign know-how.

It should be noted particularly that the statements of objectives exemplified above include, in each case, a quantification of the objectives. This gives concrete form to the organization's task and affords a means of measuring its achievement. Business thrives on clear statements in quantitative terms. Of the beneficial effect of precise objectives, including quantitative measurements, G. Cyriax has said:

"Given a reasonably clear objective (maximizing the return to equity shareholders), reasonable incentives (which relate pay to performance) and a reasonable method of enabling executives to establish the return on capital under their command, many U.S. corporations show what first-class results can stem from no more than above-average individual abilities.

"Confusion about objectives, on the other hand, is profligate of talent, as should be well known from the history of the British nationalized industries. These industries, until 1961, had no agreed aims, and at various times were instructed to maximize output, to balance their results one year with another, to reduce prices and to earn a satisfactory profit. Fuzzy objectives led to fuzzy management, and it was only the fixing of target rates of return on capital five years ago, combined with the imaginative appointments of men to administer the targets, that created a dramatic improvement in morale."<sup>2</sup>

The same principles of decentralization may be applied when the managers of individual projects are selected and when their powers and authority and the relations between them and the development agency are defined.

#### *The implementation process*

In the course of implementation, changes in the project management are likely to result in changes of method, in failure to understand the purpose of some

<sup>2</sup> *The Financial Times*, London, 28 July 1966.

aspects of the work already done, and in new interpretations of the stated objectives. Any one of these can lead to a waste of the work previously done, to additional expense, to loss of time, and even to confusion over the precise form or purpose of the project. It follows from this that a high degree of continuity in the project team, from the inception of the project all the way through to successful operation, is critical to the successful establishment of an efficient enterprise at the lowest feasible cost. Individuals or organizations may be attached to, or detached from, the project at different times as different skills are required, but consistency and the preservation of the understanding and insight that accumulates as the work proceeds demand a substantial degree of continuity of personnel.

The principles described earlier are just as applicable when the development agency has set up an organization to carry out an individual project as they are at the higher levels. When the actual implementation of the project begins, the development agency may leave direction and control to the project management. The actual method of handing over responsibility is none the less a gradual one. There will be a "twilight" period during which the management may gradually assert more and more control, but the development agency will still be intimately concerned with the working out of the basic lines of the project. During this time, a detailed exchange of ideas and close co-operation in arriving at firm implementation plans are essential to ensure complete understanding and unity of purpose between the intended management and the development agency. This relationship will probably continue up to the point where contracts for the building of the factory and the procurement of plant and the finance have been signed. At that point, all plans should be firm and the management should assume full control.

Each project should almost invariably be carried out by an enterprise formed for that particular purpose. The enterprise may be under the control of a board of directors appointed by the leading participants in the project, i.e. the development agency and such partners as may join it (as discussed below), including perhaps some or all of the financial participants. As always, the objectives of the enterprise should be clearly defined. They may be the subject of discussion between the development agency, its co-participants in the project and the project management and, as mentioned above, the objectives should be further elaborated in close consultation as the programming of the project goes forward. The development agency should inform its co-participants and the project management at the outset of any restrictions it intends to place on the freedom of action of the board of directors and of any way in which it is expected that the growth of the enterprise may be limited or affected

by broader economic considerations. A failure to do this until after the business interests have become committed to the project may destroy their confidence in the development agency and endanger the success of the project.

The development agency should recruit the top as well as the middle management of the project. Top management includes the members of the board of directors and the general manager, while middle management comprises the functional managers responsible for certain administrative and technical activities such as personnel and quality control.

A problem common to almost all developing countries is the scarcity of personnel qualified to occupy management posts, especially technical management posts. Even if the development agency is able to recruit outside experts with the required technical experience, these experts may not have previously worked in a developing country. Consequently, a technical manager may find himself contending with unexpected difficulties, owing, for example, to special climatic conditions, to lack of easy access to specialist consulting engineers etc. Moreover, if he is absent for any reason, as when he has to go abroad for consultation and no local replacement is available, problems of continuity may arise. Therefore, for very important projects, it is generally advisable to secure the technical participation of an organization (domestic, if there is any, or foreign) that is experienced in the same field rather than engaging a number of individuals. Such an organization will put one of its own staff into the technical management position and provide him with supporting key personnel, will put its experience and research and design facilities at the disposal of this personnel and provide continuity by replacing them in case of absence. Moreover, such an organization can also provide training for local personnel who will eventually take over.

Technical help provided in this way usually comes from an organization falling into one of the following three categories:

- (a) Technical collaborators. This term means an organization that has no financial stake in the project, but contracts to give technical assistance for an agreed fee over a period of years for a specified range of products. This usually includes feasibility studies, plant designs, obtaining quotations, advising on the status and efficiency of suppliers, training of staff, supervising erection and assisting in bringing the plant into operation. The organization may second technical staff to the project for a period, additional technical help being provided on an annual fee basis or a royalty, based on the sale of the product or on a proportion of the profits, or perhaps on a combination of these two.
- (b) Foreign technical partners. This term means a

foreign organization that puts its own money into the project, has directors on the board and derives benefits directly from the efficiency of implementation of the project and its final success. An independent fee is normally charged for the services it provides in bringing the project to fruition, as outlined above for a technical collaborator. The technical partner will usually provide the project manager and key staff to take charge of the installation of the project. When the plant comes into operation, it normally supplies the key staff, and in some cases the general manager as well, for an initial period of several years, gradually reducing their number as national personnel achieve the necessary competence to replace the foreign staff.

- (c) *Technical consultants.* This term applies to an organization that has no financial stake in the project and that should have no connexion with any manufacturers or contractors concerned with it. It carries out limited technical tasks for agreed fees. During the implementation of the project, the same consultant may undertake several consecutive independent contracts as each phase is completed and decisions are made to proceed further. Typical of the individual tasks that the consultants may carry out are feasibility studies or their improvement, advising on site selection, preparing plant specifications and obtaining tenders, advising on the award of contracts, advising on staff recruitment, inspection of equipment before dispatch to site, providing supervision of erection and supervising tests of plants. The training of personnel and provision of project management from their own staff are usually outside their scope of service. Their interest normally ceases when the project implementation is completed and the plant is ready for production.

There may be considerable overlapping between these categories of technical help, especially between the first two. The choice of the right type of technical help depends on the stage of development of the country in question and the availability of local know-how in one or more of the fields required for the implementation of the project and later for its efficient operation.

The success or failure of the project in its operational phase depends to a great extent on the quality of the "general management", a term often used to denote the general manager and middle or functional managers (those in charge of personnel, administration, purchasing, sales, accountancy etc.). Owing to the scarcity of qualified personnel in developing countries, such staff may have to be provided in a variety of ways. The

development agency may ask a locally established enterprise to provide them (preferably an enterprise with experience in the type of products to be manufactured in the country), or get a foreign firm to provide them, or recruit them from the open market.

A decision should be taken on whether the firm that is to provide part of the management should have a financial stake in the project. This question should be considered in accordance with the specific conditions of the country. If the decision is positive, the size of the investment to be made by the organization(s) that would participate in the project (as technical and perhaps management partner) calls for careful consideration. On the one hand, it may be important to make the financial participation in the project sufficiently large to involve the firm substantially in the operation of the project, and on the other, the development agency must consider the question of voting control, as well as the right to nominate or appoint members of the board. In addition, further finance may be required from sources that will have no part in the management. Such funds may be obtained by issuing shares to the public, but this kind of fund-raising is often likely to be unsuccessful in developing countries; a more promising method is to approach financial institutions such as development banks, commercial banks and international financial institutions. These institutions may also insist on the right to appoint directors to the board as one of the conditions on which they will provide financing.

After negotiating their respective roles, rights, responsibilities and financial contributions, the promoters of the project (the development agency, technical partners/collaborators and other participating bodies) should decide on the project management that is to proceed with implementation. The technical partners may best fill the role of the project management during the design and programming stage, but it may also be preferable to form the board of directors at this stage and ensure its functioning. The board, in consultation with the promoters, may then appoint the project manager, who should be personally responsible for all aspects of implementation under the general directives and financial control of the board. Adequate funds should be at the disposal of project management to carry out the project implementation with minimum delay. Sometimes the project manager becomes the general manager when the project goes into the production phase. However, the two posts require differing abilities and experience.

#### *Programming and control of project implementation*

The basis of the work of the project management should be the feasibility study. Because of the time that may have elapsed between the completion of this study and the commencement of the work on the project,



many relevant circumstances are likely to have changed. Hence, it will often be necessary for the study to be updated. As the feasibility study will often reflect a number of objectives of the enterprise, all the promoters should be in full agreement on its final form.

The project management must follow an implementation plan that will ensure that each of the numerous elements and tasks or activities connected with the project falls into its proper place, chronologically and financially. The feasibility study will have particularized most of these elements and activities to a certain extent, but the project management will need to survey all of them, down to the last detail. The project management should then develop an implementation plan that will ensure that every activity in a large sequence of activities will take place and that they will start and end in the right sequence. The elements and component activities necessary for the implementation of a project may include some or all of the following:

- (a) Site for the factory: investigating the title of land, acquiring land, clearing and levelling land;
- (b) Plant and equipment: designing plant and equipment, preparing tenders, obtaining quotations, finding out status and efficiency of suppliers, placing orders, inspecting, erecting and testing;
- (c) Factory buildings (and perhaps housing for management and/or labour and construction of access roads): designing the buildings and roads, preparing tenders, obtaining quotations, finding out status and efficiency of contractors, selecting contractor and type of contract, placing or supervising and inspecting construction;
- (d) Materials (raw materials, components, semi-manufactures, ancillary items etc.): designing specifications, preparing tenders, obtaining quotations, finding out status and efficiency of suppliers, placing orders, inspecting;
- (e) Service (including electric power, water, gas, means of disposing of scrap or waste, means of disposing of effluents, telecommunications, rail and road services etc.): determining requirements, negotiating with authorities, final agreement, providing services;
- (f) Finance: Finance may already have been arranged, but sometimes the precise amount will not be known until the final project designs and plans have been drawn up and prices obtained from contractors and suppliers. Moreover, some of it may be required in the form of foreign exchange, which may require government approval;

- (e) Manpower (managerial, skilled and unskilled labour necessary for the operation of the project): recruiting, briefing, training, transporting to the site etc.

The programming and control of project implementation are difficult for various reasons. Funds to finance the undertaking are frequently limited. Delays in implementation waste scarce resources, increase maintenance and repair work or spoilage and thus increase costs. The manpower skills and experience necessary for the type of work or for the scale involved are frequently scarce, and thus dependable estimates of productivity and resulting time, resource and cost requirements are not simple to develop.

Successful implementation requires efficient programming of implementation and effective control of implementation, as discussed below.

#### *Efficient programming of implementation*

The term "implementation programming" is used here in its broad sense to indicate not only the process of subdividing the project into its component activities and developing their sequential relationships, but also to include for each of these activities the selection of methods, the assignment of resources, the estimating of time requirements, and the establishment of time-scheduling data.

Efficient techniques for the programming of implementation must be capable of identifying those component activities that, by virtue of their work content and sequential relationships, control the time the project will take. In other words, if the performance of one or more of these activities is delayed, the project completion date will be delayed by a corresponding amount. The project management should know which activities these are so that it may know where to concentrate its effort when needed as, for example, when the project duration is to be shortened. These techniques must be able to provide adequate solutions for the problems of time-cost trade-off of project activities and allocation of scarce resources (such as materials, cement, structural iron and steel, and equipment, especially imported equipment, certain categories of skills, foreign exchange etc.).

The time-cost trade-off problem arises because most of the activities into which the over-all project is subdivided can be performed by alternative methods requiring different amounts of time, resources and money. Methods of performance that decrease the time requirements tend to increase direct, or variable, costs. The direct costs will rise more rapidly in some cases than in others as work is expedited. If the project completion time is arbitrarily specified or is set by external controls, these programming procedures will attempt to develop a combination of activity scheduling

that meets the completion deadline with the lowest total direct cost. A more general problem arises if the procedures are applied to determine also the most favourable completion date. Here an additional consideration is that reductions in project duration result in lower indirect, or fixed, costs. The time-cost trade-off is made with the objective of finding the schedule giving the lowest combination of direct and indirect costs and, hence, the lowest total costs.

The main problem of allocation of resources is to determine scheduling so as to use available resources in as favourable a manner as possible. Most activities in a project require the use of one or more resources. If these requirements are stated and an initial schedule is developed, the number of units of each resource needed during each time period can be determined. If the demands for a resource at any time exceed the supply, potential bottlenecks can be identified in advance and some activities rescheduled to reduce the concurrent requirements for the resource. Sometimes this rescheduling necessitates extending the duration of the project. In such cases, a principal objective is to minimize the extension; frequently, a time-cost trade-off approach can also be useful. Excessive resource requirements can usually be satisfied by means other than rescheduling, but these means involve replanning of some project activities and higher costs. A secondary problem of resource allocation is to keep resource requirements at as even a level as possible. Peaks and valleys in resource schedules invariably indicate uneconomic performance. Improvements can be achieved to some degree by rescheduling. The utilization of idle resources may also provide good opportunities for favourable time-cost trade-offs.

A more complex resource-allocation problem arises when it is necessary to schedule concurrently several projects drawing resources from the same resource pools. An additional difficulty is that a larger amount of data must be considered simultaneously for multi-project analysis than for an analysis of a single project. The respective priorities of the various projects and the mobility of resources from project to project must also be considered.

Even an implementation plan that is sound and well-conceived initially may cease to be so during the progress of its execution. For example, the actual durations required for individual tasks will frequently vary from those forecast even by the most competent estimators. Suppliers of services and materials may fail to perform on time or in the way promised. Management of the project may turn out to be poor; or external factors over which there is little or no control, such as unusual weather, labour strikes or changes in government policy may prevent the undertaking of the project as planned. Therefore, procedures for programming and control of implementation should be

flexible enough to permit modifications when they become necessary or advantageous. If an implementation plan is not altered to reflect the inevitable changes that occur, it ceases to be valid.

For truly effective implementation, programming should be carried out in greater detail as the job progresses. No matter how excellent the original programming, there are practical limits on the amount of detail that should be developed at this early stage, and extremely detailed over-all implementation programming is not justified. However, work in the immediate future can profitably be programmed in great detail. Therefore, detailed implementation programming for a limited period ahead should be carried on as the work progresses and should supplement the original, or updated, master implementation programming. There should also be a constant effort to improve job performance through replanning. Unforeseen conditions may offer opportunities for improvements. Sometimes a better knowledge of job conditions and of actual productivity levels makes it possible to make advantageous changes. While it is commendable to follow a well-conceived plan of implementation faithfully in order to reap the benefits of the skill and thought that have gone into its development, it is wiser to continue to seek better solutions and, when they are found, to be willing to change the plan accordingly. (The change should be very carefully analysed to determine that it is, in fact, an improvement.)

It has also been mentioned before that for an implementation plan to be executed successfully, those who manage the work should know the relative importance of the elements of the plan. This will allow them to concentrate efforts where they are most needed. For example, deviations in the timing or the sequencing of activities can have negligible or extremely serious effects. The implementation programming procedures should indicate the nature of these effects to project management. Effective control also requires that appropriate corrective action be taken after changes occur in order to re-establish a realistic project implementation plan.

Therefore, great stress must be laid on continued programming throughout the implementation of the projects and on checking that actual progress is on schedule. This covers both physical and financial targets, and the main check on progress is through reporting, as discussed below. Unfortunately, the task of reporting is usually unpopular and is given minor attention. No one likes to be recorded as falling behind in his work. Those engaged in reporting often feel their efforts would be better employed in more productive activities. Progress evaluation frequently takes place long after the end of the period to which the reports refer. Good reporting needs the co-operation of all concerned.

### *Evaluation of progress*

In many developing countries, owing to a lack of effective communication among the organizations involved, there is no efficient basis for making periodic evaluation of progress nor for necessary adjustments in strategy when conditions change. Each element in the hierarchical organization for industrial development should continuously observe the performance of the elements below it in order to ensure that those elements are punctually achieving their stated objectives. Planning committees should keep in touch with their development agencies, development agencies with project management, project management with project staff etc. In addition, time and energy must be devoted to promoting good liaison between different elements in the hierarchy. For example, the development agency should build up personal links with the project management with a view to creating more than one level of contact with the project.

The life-blood of this kind of contact is information. A flow of accurate, up-to-date, relevant information reaching the right point at the right time is essential for control, correct decisions, co-operative action, correct mutual adjustment and understanding. The information is nearly always in writing when it is sent from the project to the development agency, or from the development agency to the planning committee. Within an organization, however, it is sometimes communicated orally, for instance, on the factory floor or at staff meetings and meetings between separate organizations.

A few points concerning the relationship between the development agency and its projects may be mentioned. The development agency will wish to ensure that the implementation plans it has agreed upon with the management are, in fact, carried out; that resources are devoted to the purpose for which they were intended; that costs are kept within estimates, that the project takes no more than its appropriate share of scarce resources and materials, and that the time schedule is adhered to. Because the project may from time to time require its help in the form of extra money, allocation of scarce resources, influence with the government to secure tariff changes etc., the development agency should ensure that it is kept fully informed so that such requests can be foreseen well in advance and be either assisted or prevented from arising. The development agency, being responsible for a number of projects representing a broad sector of industry, will wish to have early warning of developments in a project that may necessitate consequent modifications in other projects.

### *Reporting of progress*

It is important to note that the follow-up procedure should not weaken the management's independent

control of the undertaking or worsen the relationship between the management and the development agency. What the development agency needs is continuous, up-to-date, relevant information on the progress of the project, in a summarized report containing little detail. Such a report imposes the least extra work on the management and distracts it as little as possible from its main task.

There may be other authorities that should receive reports from the project. Certain departments or government agencies, outside the hierarchy responsible for industrial development but concerned with some aspects of the project, may need to be kept informed of its progress, e.g. the agencies concerned with transport, power, public health, labour, housing. The sources of capital will also require follow-up reports from the project. The management would bear an intolerable burden if it were compelled to produce separate information for all these agencies. It is, therefore, highly desirable to evolve a type of report that can, for the most part, be put together as a matter of routine at the junior management level, in a form suitable for all recipients but permitting parts to be eliminated as the report moves up the hierarchy or outside it. A possible method would be to have a series of columns or sections, all of which have to be completed, submitted to and collated by the management accountant, and some of which are required by all who are to receive information. Since each element in the hierarchy of industrial development has a broader responsibility than the one below it, those in the higher echelons will require less detail than those with more specific responsibilities in the lower echelons, and the form of the reports should reflect this. As the reports move upward in the hierarchy, certain sections or columns can be ignored or eliminated from the copies as they are passed on.

Thus, the project manager needs to create a system of reporting that not only covers the work of his staff but also links the work of the civil engineering contractors, the machinery suppliers and the erection contractors with his office. The system should be designed principally to enable the manager to compare the progress of each item in the preparatory and construction schedule with the actual programme, and to compare its cost with the estimates. The form of the report will depend on the size of the project staff and the degree to which control of the contractors and machinery suppliers is exercised directly or through consulting engineers, architects, technical partners etc. Whatever the methods adopted, it is essential that reports on the progress of all parts of the work be brought together rapidly at one point, i.e. the project manager's office, which should be the nerve-centre of the project. There, progress and cost can be watched and compared with the programme, the consequences

of any variation from schedule assessed, and decisions taken as to whether the implementation plans need to be revised.

The development agency should receive frequent reports during the implementation of the project. If the implementation period is reasonably short, say, up to 28 months, it would be appropriate for these reports to be provided once a month; otherwise, once in three months—this has generally been found satisfactory for most industrial projects in most countries. The reports will usually consist of statements of the amounts expended on various items of capital,<sup>3</sup> together with a physical description of the progress achieved. They should be accompanied by information about major contracts placed by the management since the date of the last report. An official of the development agency should visit the site from time to time to obtain visual verification of the reports and to keep in touch with the project management.

Receipt of regular progress reports and supporting data will enable the development agency to ascertain whether:

- (a) The money is being spent at the rate predicted and in the way agreed upon;
- (b) The progress of each element of the plant is correctly phased in relation to the other elements;
- (c) Estimates of expenditure are likely to be exceeded.

The development agency should have a systematic procedure for processing the reports. Normally the technical staff should examine the progress reports first, since it is best able to interpret the technical and practical implications, check performance and cost with the forecasts and with the terms of the major contracts placed for the project, perceive the reasons for variations from estimates and draw the appropriate conclusions. The technical staff then passes the reports with its comments to an accounting section, which checks the figures, takes note of the state of capital expenditure and makes any corresponding adjustments it thinks necessary in its own disbursement forecasts. If its study of the reports suggests that any change should be made in the capital estimates, it advises its own management and the question is raised with the project management.

If delays in implementation appear likely, the agency must consider whether the delays in one or more sections will delay completion of the project. Delays in starting up the plant will generally result in a need

for further capital, because pre-production expenses such as staff salaries and wages, rent and interest on borrowed funds will be incurred over a longer period than was envisaged. If a delay is expected in one section of the plant only, the consequences of this will have to be assessed. In a fully integrated operation (e.g. a chemical works) any delay may well delay the start of production as a whole, but this will not be so in other cases. For instance, in a spinning, weaving and finishing plant, delays in completing the spinning will need not hold up the weaving section if arrangements are made in time for the outside purchase of yarn of the right specification. Similarly, if the finishing section is completed first, it can go into production on cloth purchased outside the plant, thus minimizing the loss resulting from the delay.

It should be noted that, while changes in method and small changes in objectives may be left to the discretion of the project management, the management must still adhere to the general lines of the scheme and its stated objectives. Any proposed changes likely to cause significant differences in timing, performance and cost should be regarded as a departure from the stated objectives, requiring the consent of the promoters and the financial sources. In their turn, the promoters and the financial sources should maintain a flexible attitude. Subject to receiving timely notice, they should be ready to consider any suggested changes. The essence of successful industry is that it should be able to adapt itself rapidly to changes in the environment, and the scheme as described in the implementation plan should never be regarded as immutable. The development agency, in its turn, may have to justify the proposed changes to the Government and fight for them. Whether this is necessary will depend on the degree of flexibility in the agency's own terms of reference, as discussed above.

When the implementation of the project has been completed, the project management should prepare a final cost analysis, giving a breakdown of the capital cost into the constituent elements of each section. Such an analysis will give a clear picture of the way estimates have been fulfilled, and will provide a useful check on the estimating practices used in preparing the project.

This systematic and effective control of project implementation will enable the development agency to accumulate an inventory of valuable information on typical project activities, their actual costs, unit costs and realistic duration, and the productivity levels of the various categories of manpower engaged in implementation. Such information is of paramount importance for comparing the execution of different projects, with a view to ensuring more efficient implementation, as well as more realistic and effective future planning and programming.

<sup>3</sup> The capital expenditure should be broken down in the report into a number of headings, which can be compared with the corresponding breakdown prepared by the technical partners and project management when they made the original estimates. The breakdown should be sufficiently detailed to indicate whether any part of the project implementation is out of phase.

## SUMMARY

During the last decade, many developing countries have embarked on planning for economic and industrial development and have devoted a vast amount of effort and expertise to the formulation of development plans and programmes, without, however, giving similar attention to their implementation. Experience has shown that there are many and varied reasons for failures in implementation. Some of them are beyond the control of the country.

Although the problems of planning are formally outside the scope of this article, it must be recognized that to achieve more effective project implementation, many shortcomings in the planning process must be overcome. The planning of industrial development programmes should take into consideration: the inherent administrative, managerial, institutional, financial, political and social limitations on a country's growth potential; the aggregates based on broad generalizations, as well as the investment projects which, in the last analysis, go to make up the aggregates; consistency of programmes etc. Proper project formulation and evaluation should also be provided.

In addition to realistic preparation of industrial development programmes, the Government must also try to secure effective project implementation by a combination of: carefully devised policy measures; the creation of an effective institutional framework, with adequate powers and resources for each operative element; and organized implementation and control methods. Monetary policy, employment and wage policy, and administrative policy should have been thoroughly embodied in the development programme, but it is beyond the scope of this article to deal with these policies at any length.

At regards industries to be established by the public sector, it is essential that their implementation and control be effectively decentralized. It is, therefore, recommended that the promotion and control of their implementation be entrusted to an institution, "a development agency", which may not be part of a government department. The development agency, while preserving the Government's interests in matters affecting the direction, duration, cost and other broad aspects of the project, would protect the project from direct government involvement in the control and management and preserve the management's autonomy within its own sphere.

Thus, a hierarchy is established, with the government planning organs at the head, the projects at the bottom, and one or more development agencies in between. To function successfully, each element of the system requires: a clear definition of its goals, responsibilities and authority and adequate powers (financial etc.); qualified personnel; development of an implementation plan for that part of the industrialization programme

for which it is responsible, with available resources taken into consideration; the collection and processing of information about the performance of each part of the system below it; and flexibility in relation to objectives.

The higher an institution stands in the hierarchy, the broader in scope and the longer in time-span will be the objectives laid down for it. Each element should normally lay down the objectives for the element next below it, after full discussion with it. It is highly desirable that objectives be quantified as definitely as possible and that the objectives for individual projects be based on the relevant feasibility study.

Because the type of industry may be entirely new to the country and, therefore, various problems may arise, especially in the operation phase of the project, it is generally preferable that the management of very important projects be the responsibility of one or more existing firms for a number of years, during which they can also provide training for local counterparts. "Technical collaborators", or "technical partners", and infrequently "technical consultants" may provide the technical and perhaps the general management in the early years. A decision should be taken as to whether a firm that agrees to provide part of the management may have a financial stake in the project. This should be considered in accordance with the specific conditions of the country. If this were to be recommended, the size of the financial participation of such a firm would require careful consideration. It may be advisable that it be made large enough to guarantee that the firm will be involved in the operation of the project, and this virtually requires that the firm be given the right to appoint members of the board.

Once the promoters (the development agency and any other organization participating in the project) have agreed on their representation on the board and on the responsibilities and the limitations that the development agency intends to place on the board's freedom of action, the project management should be selected. The board, project manager and his staff have the responsibility for implementing the project and making it ready for production. They should gradually take over responsibility from the development agency, but the latter will still be intimately concerned with the working out of the basic lines of the project until the project management takes full control. Ideally, the team responsible for creation of the project should remain continuously in charge of it until the project goes into production in order to preserve the understanding and insight that accumulate as the work proceeds.

The feasibility study may need to be brought up to date. After this, project management should analyse in detail all elements of the project (such as factory site, buildings and access roads, plant and equipment) and

its component activities (the activities to be carried out in order to bring the project into existence, such as designing of buildings, preparing tenders for plant and equipment, erecting plant and equipment and testing). Project management should then lay great stress on programming and control of the implementation of the project. This includes the identifying of project activities and determining their interrelationships, the allocation of resources, the estimation of time requirements and the establishment of the most economic implementation schedule for the project, with the scarcity of resources and the required project completion date taken into account. In addition, constant checking should be carried out to ensure that actual progress (both physical and financial) is on schedule. The most effective techniques for programming and control of implementation (network techniques adapted to conditions prevailing in developing countries) should be used.

After preparation of the project implementation plan, an efficient control procedure should be employed to make the plan a reality. It should be noted that in the course of implementation, conditions change and frequently render obsolete the estimate made when the plan was prepared. It is, therefore, necessary to determine any deviation from pre-stated objectives, to study causal factors, take corrective measures and update the implementation plan to keep it realistic. This necessitates continued programming in more detail as the project implementation proceeds, and continual replanning of the existing strategy based on effective evaluation of progress.

As regards effective progress evaluation, each element in the hierarchy should keep watch on the performance of the elements below it. The requisites for success in this effort are information and liaison: a system of reports containing accurate, up-to-date and relevant information on financial as well as physical progress of the project that reach the right point at the right time; and the building up of good personal relations for a better understanding based on mutual respect, at various levels, between the elements that have to communicate or keep in contact with each other (for example, between the planning agency and the development agency, and between the development agency and the project management).

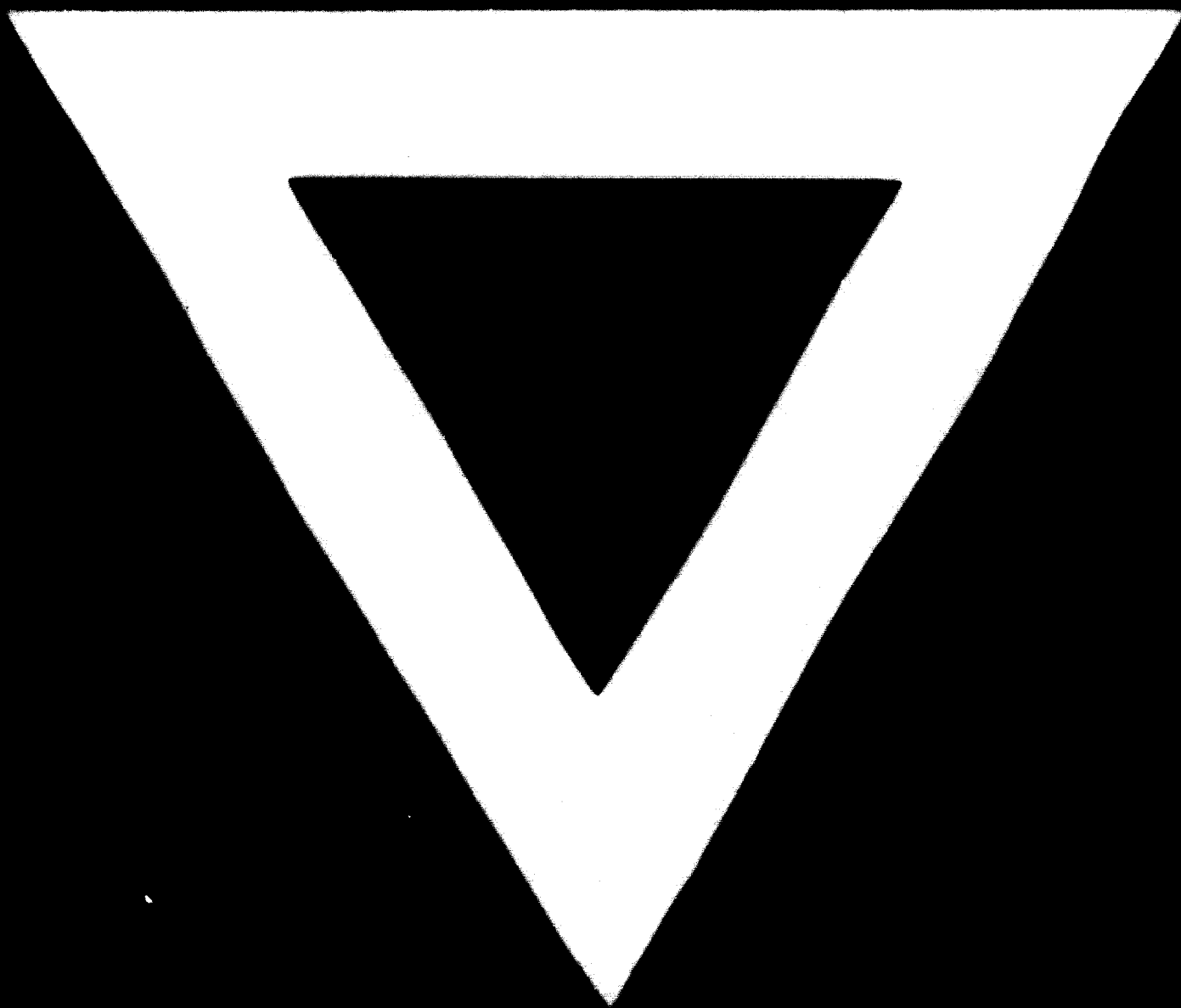
In addition to the development agency, there may be other authorities that are to receive reports from the project. To avoid putting an intolerable burden on the management, the form of the report should be such that the bulk of the report can be put together as a matter of routine at the junior management level yet will contain the information truly needed by all

recipients of the returns, although portions may be eliminated for the various recipients.

#### *Special responsibilities of the development agency*

In addition to following the progress of the project, the development agency must also bear in mind its responsibility for carrying forward a section of the country's development plan, and its staff should follow a procedure designed to ensure that this aspect will be considered whenever reports from a project are under study. Implications for other projects or for the programme as a whole should be identified and acted on, and lessons for the future or for use in connexion with other projects should be noted and fed back into the planning and implementation machinery. Each development agency will have to establish its own checklist, depending on the scope of its responsibilities and the priorities laid down for it by the programme or by the planning authority. Such a checklist may include items such as the following:

- (a) Assistance in:
  - (i) Overcoming transport delays, customs delays, delays in obtaining government licences, work permits etc.;
  - (ii) Finding remunerative short-term employment of funds if capital expenditure is taking place more slowly than expected;
  - (iii) Making early preparations to raise further funds if it appears necessary.
- (b) If progress is slower than expected, these questions should be asked:
  - (i) How will this delay affect other projects for which the development agency is responsible and which may depend on this project, for instance, for supplies of materials?
  - (ii) Is the output or the early completion of this project sufficiently important to warrant emergency action to get the programme back to normal?
  - (iii) How will this delay affect the schedule of the whole programme, and might a change in programme targets be called for?
  - (iv) Will this delay affect the Government's import policy (e.g. by allowing the import of competing goods to continue longer than previously planned), or its industrial licensing policy?
  - (v) What light does the slow progress throw on planning procedures, the efficiency of the planners or their advisers, the evaluation methods used by them etc.?



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