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CONTENTS

	<u>Paragraph</u>	<u>Page</u>
<b>INTRODUCTION</b>	1 - 7	1 - 3
<b>1. PLANNING AND PROGRAMMING METALWORKING INDUSTRIES AS POTENTIAL EXPORT INDUSTRIES IN DEVELOPING COUNTRIES</b>	8 - 21	4 - 7
1.1 Presentation of the problem	8	4
1.2 Characteristics of the methodology proposed	9 - 13	4 - 5
1.3 Brief description of papers prepared	14 - 21	5 - 7
<b>2. METALWORKING AS A POTENTIAL EXPORT INDUSTRY IN DEVELOPING COUNTRIES</b>	22 - 47	8 - 15
2.1 Definitions	22	8
2.2 Metalworking industries in developing countries	23 - 38	8 - 12
2.3 Some generalizations	39 - 47	12 - 15
2.4 World trade in the products of metalworking industries	48 - 49	16
2.5 Engineering exports from developing countries	50 - 55	17 - 18
2.6 Metalworking industries as export-oriented industries	56 - 62	18 - 20
<b>3. POLICIES FOR EXPORT</b>	63 - 71	20 - 22
3.1 Export-orientation component combined with import substitution efforts	63 - 68	20 - 21
3.2 Possible areas of assistance by developed countries	69 - 71	21 - 22
3.2.1 Transfer of technology and know-how	69	21 - 22
3.2.2 Subcontracting, joint ventures and similar arrangements	70 - 71	22
<b>4. POSSIBLE FORMS AND SCOPE OF ASSISTANCE BY UNITS IN PLANNING AND PROGRAMMING OF METALWORKING AS POTENTIAL EXPORT INDUSTRY</b>	72 - 75	22 - 23
4.1 Forms of assistance	72 - 73	22
4.2 Scope of assistance	74 - 75	23
<b>ANNEX</b>		<b>24 - 30</b>

## INTRODUCTION

1. The metal-working (engineering) sector has long been recognized as one of key importance for industrial development in general, as it includes inter alia the production and maintenance of equipment for all productive sectors of the economy. Its level of development is roughly indicative of the overall level of the country's industrial development.<sup>1</sup> In most countries, this sector is a major breeding ground for new skills, particularly those associated with technological progress in the manufacturing sector.

2. In the developing countries, engineering products account for a major proportion of import bills and they often are, therefore, natural candidates for import substitution. In the case of many engineering products, the technological minimum scale required for efficient operation is not very large and could possibly be attained if domestic demand and exports were combined. Metal-working industries are generally not highly resource-dependant and contain a high proportion of value added. While providing an element of complementarity within the economy, they offer simultaneously, more than other sectors, wide possibilities for regional or sub-regional co-production and co-operation among the developing countries, as well as for subcontracting arrangements between developing and developed countries.

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<sup>1</sup> In relative terms, following data substantiate this statement.

Industrialized countries (Except USSR and Eastern Europe)	Importance of the sector 39(1961)	Degree of industrialization 39(1964)
Developing countries	18	20
Africa	13	12
Latin America	20	24
Asia	18	18

"Importance of the metal-working sector" is expressed here by the ratio of value added in metal-working to the total value added in manufacturing sector, while the "degree of industrialization" is represented by ratio of value added in manufacturing to gross domestic product) in 1965.

Source: Sectoral Study of Engineering Industries, UNIAO Document ID/CEP.1/2.

3. The key role of the sector as well as its export potential for developing countries, was recognized in the resolution 1178 (XI) adopted by the Economic and Social Council of the United Nations in 1966. The resolution specifically referred to metalworking industries in developing countries, as an example of industries with an export potential in the development of which "there might be achieved concurrent opportunities for import substitution". Resolutions A.III.2 as well as A.III.3, adopted by the First Session of the United Nations Conference on Trade and Development in 1964<sup>2</sup>, also elaborate on the criteria for development of export industries in the developing countries and stress, in addition, the need for integrating the exports of manufactures and semi-manufactures into their development plans and policies.

4. Many developing countries have already found it desirable to establish planning and programming procedures for the sector within their development plans and projections. The metal-working sector presents, however, a great variety of both products manufactured and equipment used. The number of different kinds of products manufactured in the sector, comes to several hundreds of thousands; the number of different types and sizes of metal-cutting machine tools only, has been estimated at over fifteen hundred. Moreover, a given piece of equipment normally produces a wide variety of products. With imports and potential exports added to planning elements, it is clear that a startling number of combinations exist.

5. The Interregional Symposium on Metalworking Industries in Developing Countries, held in September-October 1966 in Moscow, once more called the attention of the United Nations to "the prime significance which the metal-working industry has for the welfare of the developing and developed countries". Among the recommendations adopted by the Symposium, the following are of special importance in connexion with the problems of raising the export potential of metal-working industries in developing countries:

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<sup>2</sup> Proceedings of the United Nations Conference on Trade and Development, Volume I, Final Act and Report, United Nations, New York, 1964.

- "The United Nations should increase its help in advising the developing countries regarding planning and organization of the development of metal-working industries, and in selecting the types of products to be manufactured";
- "The assistance of United Nations is recommended in securing low tariffs for the export of metal-working products from developing countries";

In addition, the plans recommended for the developing countries, inter alia, to "establish an agency for improving the collection of statistical data for the sector and to carry out machinery censuses at intervals".<sup>3</sup>

6. The aim of the project whose main features are being presented to the Expert Group is basically twofold: to help in assessing the potential role of metal-working industries for the developing countries' balance of payments, both from import substitution and export promotion points of view; and, to lend planning and programming methodology which would enable the decision-making bodies in the developing country to plan for the development of the sector as a whole, having at their disposal reasonably full, but not burdensome, data. For these aims to be achieved, the above-mentioned diversity of the sector should be approached in such a way that the planning and programming tasks required, become technically manageable and economically rational.

7. The approach suggested is expected to give answers to questions such as what kind of investments are recommended, their branches and what product sub-branches within these branches should receive the main emphasis, and what export branches deserve serious promotion efforts. It should lend the means of arriving at the determination of the minimum scales of output and of the relative proportion of production for domestic versus foreign markets, that would be required to facilitate domestic production on a competitive basis.

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<sup>3</sup> Report of the Interregional Symposium on Metal-working Industries in Developing Countries, UN publication, Sales No: E.66.II.B.3, pp.88-89.

## 1. Planning and Programming Metal-working Industries as Potential Export Industries in Developing Countries

### 1.1: Presentation of the problem

8. Existing approaches to programming for the sector, have concentrated largely in two areas. The first has been aggregate estimation of the desired growth of the sector, loosely coupled with product-by-product feasibility studies for project analysis. This approach neglects the technological inter-connections between branches of production and leads, usually, to an over-estimate of projected costs. The second approach is the construction of material balances in which individual case studies serve mainly to fill in the detail of a plan which has already been pre-set in its major dimensions. In this approach there is insufficient attention to evaluation programmes.

### 1.2: Characterisation of the methodology suggested

9. The methodology, as proposed within the project, cuts across the great diversity of the sector in terms of both equipment and products, by representing each production process by a limited number of standard tasks, defined by size of work piece and length of production series. Each of these tasks is in turn associated with one or more standard shops or resource elements that have a typical machine park. The concept of resource element permits the production of the great variety of actual production facilities by a limited number of typical shops. On the demand side, a number of sample products that are typical of the sector in terms of physical characteristics and production processes involved, are selected in order of importance in total demand. On the basis of the resource requirements obtained from these sample products, total sector inputs are estimated for sector wide product lists.

10. The combination of resource elements, typical sample products and demand estimate, leads with three essential problems:

- (a) it represents a method of technological description which transforms the sector's diversity into a manageable problem, determines the technical inter-relationships via multi-purpose facilities and highlights the existence of indivisibilities and economies of scale due to seriality;
- (b) it focuses on the sector as a whole, thus enabling the planners to deal with the joint utilization of productive



facilities by diverse final products, and

- (c) it permits the orientation towards exports due to the re-organization of productive facilities around processing tasks at both projected levels of domestic demand and for export market.

11. Within this approach, productive facilities need no longer be captive to the final product, unless the speciality considerations warrant it. Thus, idle production capacities, present in many developing countries, may have a greater chance of being utilized in a process-oriented sector.

12. The technical description of the sector is to proceed in different levels of detail. Semi-quantitative programming data aim primarily at defining lists of products and productive processes and at establishing incidences between these two, that is, specifying whether or not a given process is used in the manufacture of an individual product. Fully quantified programming data would quantify, in sufficient detail, the pattern of physical inputs and outputs associated with the production of an individual product. Fully-quantitative data would go next therefore, in intermediate position between the two extremes, of semi-quantitative data and the final stage of project engineering data, and is intended for techno-economic descriptions of the sector. On the basis of input and output relations, approximate estimates of production costs could be undertaken. Demand estimates, both domestic and for exports will complete the quantification process.

13. It was suggested in the initial stages of conceiving the project on metalworking industries as potential export industries, that two pilot country studies would be undertaken to test the methodology developed. Due to various reasons, mainly connected with limited finance allocation, this was not possible to carry out as yet. The preliminary procedures, the type of machinery to be used, etc. have however been prepared.

#### 1.3: Brief description of papers prepared

14. Altogether nine papers have been prepared on various problems relative to the project in order to facilitate the deliberations of the Expert Group. Some of them cover the whole range of problems, others elaborate in some detail on some specific crucial problems, and some get out to

describe a country's experience in planning and programming for the sector.

15. The methodological basis of the approach is to be found in the paper on Metalworking Industries as Potential Export Industries, prepared by a team headed by Professor Thomas Victorisz at the Centre for Economic Planning of the New School for Social Research, New York (ID/EG.10/1). A short summary of this paper has been prepared by UNIDO under the symbol ID/EG.10/6, while the latter represents mainly a summary of the former, it has also merits of its own.

16. Paper on Programming of Production and Exports for Metalworking: Models and Procedures, by Professor T. Victorisz (ID/EG.10/2) represents a logical extension of the basic study. Three simple programming models are suggested as a basis, from which generalization and modifications can be derived. The models are formulated in linear programming format with non-convexities (such as economies of scale and indivisibility) treated as integer variables.

17. The following studies relate to a country's experience in production and export of engineering. A paper on Production and Export Planning in the Engineering Industries by Dr. A. Déak, Ministry of Finance, Hungary (ID/EG.10/3), presents a discussion of both traditional macro-economic planning methods, as well as a description of mathematical planning methods used in long-term planning in the Hungarian engineering sector. Another paper, Planning Methods in Engineering with Special View to Export Interests (ID/EG.10/4) has been prepared by a panel of Hungarian experts. This study deals with problems of economic policies and development plans in engineering, mathematical methods of planning and programming the sector, and with some types of incentives for export promotion of engineering goods.

18. Some of the specific issues relating to the collection, presentation and processing of semi-quantitative programming data are dealt with in a paper by N. Ginsburg, New School for Social Research, New York, "The Metalworking Industries: Semi-quantitative Data" (ID/EG.10/4).

19. A study by Professor Van Court Hare, Jr., Columbia University, New York, on "Structural Implementation of Input-Output Models" (ID/EG.10/5), deals with the issues encountered in the process of decomposition of products and resource elements for the above engineering branch. Special features of this branch as regards the planning of production and exports, as well as marketing problems, are also discussed.

20. A paper by Richard Lissak, "Sampling Methods" (10/29.10/7) concentrates on elaborating the approach to another partial problem involved, namely on methods of projection of domestic demand (including replacement for production goods in a sectoral detail). Methods of direct census of equipment as well as indirect estimates based on accumulated investments over the past years, are dealt with.

21. A report by Dr. A. Ben, Survey of the stock of equipment in the Israeli metalworking industry and estimated replacement needs, Haifa 1968, has also been made available to the meeting (10/29.10/11). The paper aims at estimating the present potential of the Israeli metalworking industry and examining the changes required in equipment and technology in order to improve the technological and economic standards of the sector. Information and data relating to a sample of Israeli plants, are given as well as the type of questionnaire used during the survey.

## 2. Brief Review of the Present Status of Metalworking Industries in Developing Countries

### 2.1: Definitions

2.2. For the purpose of present paper, the term metalworking or engineering industries is understood generally to represent industries which are engaged in manufacturing products classified under the following groups in International Standard Industrial Classification (ISIC) and Standard International Trade Classification (SITC Revised).

<u>Activities<sup>a</sup></u>	<u>ISIC</u>	<u>SITC Revised</u>
Manufacture of metal products	Group 35	EX 69
Manufacture of machinery other than electrical	Group 36	71
Manufacture of electrical machinery, apparatus, appliances and supplies	Group 37	72
Manufacture of transport equipment	Group 36	73
Manufacture of professional, scientific measuring and controlling instruments	Sub-Group 391	EX 86

<sup>a</sup> Repair work is also a significant part of total activity in these industries.

### 2.2: Metalworking industries in developing countries

2.3. Metalworking industries account, at present, for about one-third of the world's industrial production in terms of value added. They represent the most dynamic industrial sector, in developed as well as in the developing countries. As illustrated in annexed table 1, within the developing regions, the more pronounced rate of growth occurred in Asia rather than in Latin America. Notwithstanding the marked dynamics, the share of developing countries in the world metalworking production is still very limited, representing some 4 per cent of the world's value added in metalworking industries. Incidentally, this is the lowest proportion of any industrial sector in developing countries in the world production by the sector.

2.4. As experience has shown, simple metal products group (ISIC Group 35) is usually the first to develop in the developing countries. Repair and

maintenance facilities for simple transport and electrical equipment are also being established on this initial stage. The next stage is the assembly and, later, the manufacture of transport and electrical equipment and appliances, simple non-electrical machinery etc. It is usually only in the third stage that more specialized types of machinery and transport equipment are manufactured.

25. The International Symposium on Metalworking Industries in Developing Countries, classified the developing countries into three groups, according to the degree of development of their metalworking industries.

- Group I : Countries whose metalworking production is already developed and diversified;
- Group II : Countries whose metalworking production is in an initial stage;
- Group III : Countries without metalworking production, or with such production restricted to repairs and simple metal manufacture.

26. Four countries - India, Argentina, Brazil and Mexico - are considered to belong to Group I, each having already a diversified metalworking industry. Group II includes Chile, Colombia, Indonesia, Iran, Pakistan, the Philippines, Turkey, Venezuela and United Arab Republic. The manufacture of machinery and equipment is, in these countries, restricted to relatively simple types. All other developing countries are considered to belong to group III.<sup>1</sup>

27. Table 2 (annexed) gives an illustration of the specific weight of individual developing regions and, of selected most advanced countries within these regions, in terms of population, gross domestic product, manufacturing sector and engineering sector. In respect of engineering industries, and taking into account the population distribution, Latin America was most advanced among the regions, followed by Asia, Middle East and Africa. Northern Brazil, Mexico and Argentina were mainly responsible for the achievements within Latin American region, India within the Asian region, and North African countries for those in Africa.

28. Metalworking industries were in India in 1963, second in importance among the whole manufacturing sector if judged by percentage distribution of value added (17.85 per cent of the total). They were preceded by the textiles sector (ISIC Group 23 - 25.33 per cent) and followed by food,

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<sup>1</sup> Report of the International Symposium on Metalworking Industries in Developing Countries, UNIDO Vienna, 1968 (UN Publication, Sales No. E.68.II.9)

handicaps and business incentives (1970-75 committee for 15.75 per cent). The value of production output has been rising considerably during 1964-1966:

<u>Year</u>	<u>Output (million rupees)</u>
1961	12,400
1965	16,100
1966	17,000

21. In 1967, there were more than 16,000 engineering establishments in India employing the total of 1.4 million workers.<sup>5</sup>

22. Metalworking industries of Indonesia contributed 26.3 per cent of total manufacturing activities in 1964 and represented thus the leading sector. Manufacture and assembly of transport equipment was the most important branch within the sector, followed by electrical machinery and equipment.

23. In Spain, the share of metalworking industries constituted 17.7 of total manufacturing activities in 1964. The leading position of transport equipment and electrical machinery branches were even more pronounced than was the case of Indonesia.

24. Mexico's metalworking industries ranked the third in the percentage distribution of value added in manufacturing (12.5 per cent), preceded by food, beverages and tobacco sector (21 per cent) and chemical sector (17 per cent). Within the metalworking sector, transport equipment and electrical equipment branches had taken the highest shares.

25. Metalworking industries in Chile contributed 12.5 per cent to the country's total manufacturing activities in 1964. Here, however, the composition of the sector differs from that in the countries mentioned above. The simple metal products branch occupies the most important share within the sector, followed by transport equipment branch.

26. In Colombia, metalworking industries ranked third in importance; first two places being held by food, beverages and tobacco sector and textiles sector. Like in Chile, simple metal product branch is the most important within the sector (1965):

<sup>5</sup> India's Engineering Industry, Engineering Export Promotion Council, Calcutta, 1967.

	Number of establishments	Value added (million rupees)
Group 35	730	562
Group 37	270	142
Group 37	252	407
Group 38	646	769
<b>Total:</b>	<b>1,912</b>	<b>1,882</b>

35. In the Philippines, engineering industries occupied the second/third place within the manufacturing sector in terms of value added in 1963, together with the chemical sector. Within the sector, non-electrical machinery branches were the least developed in 1961.

	Number of establishments	Value added (million rupees)	Number of persons employed (thousand)
Group 35	367	112	17.3
Group 36	167	73	1.9
Group 37	119	130	12.9
Group 38	247	111	12.2
<b>Total:</b>	<b>910</b>	<b>434</b>	<b>46.2</b>

36. Pakistan has 12 other industries are the fourth in the order of importance within the manufacturing sector, contributing 7.0 percent to its total value added in 1963. Following was the structural composition within the sector:

	Number of establishments	Value added (million rupees)	Number of persons employed (thousand)
Group 35	520	75.3	22.3
Group 36	202	24.7	7.0
Group 37	96	50.5	19.1
Group 38	143	71.0	16.1
<b>Total:</b>	<b>793</b>	<b>221.1</b>	<b>69.1</b>

17. United Arab Republic: metalworking industries occupied the third place in the manufacturing sector in 1963 (17.6 per cent of the total value added). As to its structure within the sector, following was the distribution in 1963:

	number of establishments	Value added (million \$ a year)	number of persons engaged (thousands)
Iron and steel	278	4.0	13.6
Non-ferrous	47	3.1	3.6
Machinery	33	6.4	3.2
Other	84	5.6	10.6
<b>Total:</b>	<b>442</b>	<b>19.1</b>	<b>31.0</b>

Also in Venezuela, the metalworking industries were third in importance (12 per cent of the value added in the manufacturing activities). The three largest groups were non-ferrous metal and electrical machinery groups within the sector.

2.3. Some generalizations

19. Large amounts of the development of metalworking industries in developing countries have been provided by import substitution programs under substantial and, sometimes, somewhat excessive, protection and tariff reductions. These industries have commonly supplied demand in their domestic markets.

20. Finally, as a result of the relative employment of national work in the majority of developing countries, the cost of many industries have remained high. In fact, in fact, has often led to the establishment of economic units which have not attained the productivity of modern industrial techniques and have not enjoyed a desired rise in productivity after the "infant period" has been passed.

21. Import substitution to ease other export trade pressure on the country's balance of payments through its inherent export requirement (raw materials, semi-processes or finished parts that are to be imported from abroad) is a vital input for immediate production. If the process

per capita income, economic growth in developing countries has not yet reached a level that is forty times less than per capita income for such countries in the United States.



of import substitution tends to spread indiscriminately over many sectors or branches, the advantages of specialization are difficult to obtain. Finally, in some developing countries, industrialization based on import substitution has reached its limits and the need arises for technically complex substitution programmes, which usually require large markets, if a reasonable degree of economic viability is to be attained. These limits can hardly be exceeded without a considerable waste of capital.

12. The differences in production costs between developing and developed countries could be illustrated on the case of automotive production. The number of assembled and partially manufactured vehicles in developing countries reached a figure of 800,000 in 1965. About sixty per cent out of this total has been produced or assembled by Argentina, Brazil, Mexico and India. Another 20,000 vehicles have been turned out by 18 other developing countries, some of them accounting for less than 1,000 units per year. The costs of comparable units are by 60-150 per cent higher in Brazil, Mexico and Argentina and approximately 120 per cent higher in India, as compared with USA or Europe. The higher the domestic content, the higher the costs.<sup>2</sup>

13. Low labour productivity in the developing countries' metalworking industries is apparently compensated for by the low wage costs per employee. It has been estimated that if relevant US figures are taken for 100, value added per employee in India's metalworking industries is 4 and so on the employee per employee. In Yugoslavia metalworking sector the productivity index is 10, the earnings index 6, while in Peru it was 20 and 10-15 respectively.<sup>3</sup>

14. The linkages of metalworking industries with other sectors are considerable. The principal forward linkage of the sector is the demand for investment goods. The main backward linkage of metalworking industries is basic metals, especially iron and steel. It is estimated

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<sup>2</sup> Automotive industries in developing countries (UNCTAD document ID/AM.1/1/1967)

<sup>3</sup> Sectoral study on Engineering Industry, UNCTAD document ID/AM.1/1/1967 (Data for USA and Peru refer to 1964, for India to 1962 and for Yugoslavia to 1961).

that for \$100 of final metalworking product, between \$10 - 20 of gross output is required from the basic metal sector, mostly flat ferrous products, forged products and castings. While the development of the sector is clearly facilitated by the availability of such inputs, a number of developing countries developed certain branches of the sector based on imported steel. This is true, for instance, for Pakistan, the Philippines, Indonesia, Iran and a number of other countries. As regards other inputs, metalworking, unlike for example, chemical and metal sector, is not particularly power-intensive, nor does it require an especially plentiful water supply.

45. As far as capital intensity of the sector is concerned, it is generally below the average for the manufacturing sector as a whole. The economic commission for Africa indicates the capital-value added ratio as 1.1 and 1.0 respectively<sup>9</sup> capital required per unit of output in developing, but probably lower or higher in the developed ones, if not higher. Higher capital costs are sometimes the result of higher costs of machines and equipment in the developing countries, of its less intensive utilization, greater requirements for fixed investments of infrastructure type, or higher working capital requirements due to unreliability of supplies and a lower turnover. It should be added that within the sector, the capital intensity of different branches or product assortments differ considerably.

46. As regards skilled manpower, although the sector generally is one of the most demanding sectors of industry in this respect, some of its branches require less skilled labour than the average of the industry as a whole. Notwithstanding this statement, manpower training represents one of the most pressing needs in the process of development of metalworking industries in the developing countries.

47. Major world technical development trends in engineering industries which should be taken into account for future are directed towards the substitution of aluminium and synthetic materials for steel, the

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<sup>9</sup> Industrial co-operation in East Africa, Doc. E/CN.14/INR/102 ECA, 1965.

<sup>10</sup> Sectoral study on engineering industry. (Doc. ID/CONF.1/2)

development of transfer and multistage machinery and numerical programming and the development of miniature and adaptive technology capable of producing economically at smaller scales, or using different factor combinations, or more versatile multi-purpose machines.<sup>10</sup> These trends, if not a proper use of, could become conducive to a rational development of engineering industries in developing countries as well.

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<sup>10</sup> Sectoral study on engineering industry (Doc. ID/CONF.1/2)

**2.4: World Trade in the Products of Metalworking Industries**

48. Exports of the products of metal working industries, form an important part of world trade. In 1966 they were responsible for 29 per cent of all world exports (\$27 billion). The largest share of such exports originated in industrialized countries and, in fact, 94 per cent of engineering exports are accounted for by industrialized countries. The following figures illustrate the exports of engineering products in 1966.

<u>Country or area</u>	<u>Exports (\$ billion)</u>
USA	12.355
Canada	2.020
Japan	3.285
Western Europe	31.16
Eastern Europe	7.200
Other countries	1.000
<b>Total</b>	<b>57.178</b>

Source: Trend in engineering industry in OECD, 1967, OEEC, Brussels.

49. In 1966, non-electrical machinery and equipment represented 40 per cent of the total engineering exports, 21 per cent consisted of transport equipment, 15 per cent of electrical goods, 7 per cent was accounted for by fabricated metal products and 10 per cent by instruments. The domestic demand of industrialized countries is largely covered by their local production. The imports cover especially goods which are characterized by specific performance, price, taxes, or delivery conditions. There is, however, clearly a tendency towards inter-dependence by the metal working industries in developed areas. The share of imports to total internal demand is rising, especially in those western European countries: from 16.6 per cent in 1958 to 20.1 per cent in 1966 for France; from 5.1 per cent to 13.1 per cent for the United Kingdom; from 28.9 per cent to 33.1 per cent for Italy, etc.<sup>11</sup>

<sup>11</sup> Trend in engineering industry in OECD, 1967, OEEC - Brussels.

### 7.51 Engineering exports from developing countries

50. The exports of engineering products from developing countries do not form, at present, any significant part of world exports. In fact, they amount for about 1 per cent of the world total. The countries which are the most advanced in exporting their engineering goods are India, Argentina, Brazil, Mexico, Pakistan, Chile, Algeria, Iran, Iraq, United Arab Republic, Yugoslavia, Israel, China (Taiwan), and the Republic of Korea. As to the direction of these exports, the analysis indicates that in so far as products are concerned there are two different types of markets - developed countries' markets and other developing countries' markets. These markets often differ in the structure of exports, requirements and delivery conditions.

51. As in Table 3 illustrated, exports of engineering products by selected countries of advanced countries from selected developing countries. Besides the information on the specific weight of such imports in total national imports of the countries concerned, the table points out, inter alia, the diversified nature of exports to the United Kingdom. It may be seen that almost all of the selected developing countries participate in a similar manner in the export of engineering products to the United Kingdom. In fact, the exports of metalworking machines from these countries are of a similar nature to the exports of metalworking machines from the United Kingdom. It shows that the access to the United Kingdom's market for engineering products from developing countries is probably easier than in other markets. Recently, the exports from Latin American countries do not seem to have reached, or to be close to, the level of exports from some other developing countries.

52. Exports to developed markets are obviously considered most important, in view of providing the possibility for exporting countries to gain considerable earnings to support further industrialization process. It is interesting to note, however, that the markets of other developing countries are of increasing importance for the rapidly expanding manufacturing exports from developing countries. Exports of transport equipment represent, in this connection, a group with the highest weight of inter-regional trade, both in Asia and in Latin America.

1. A calculation of export flows on the basis of a three-digit SIT code for 11 exporting developing countries has been made recently.<sup>10</sup> The countries analyzed were India, China (Taiwan), Korea, Republic of Korea, Thailand, the Philippines, Ceylon, Mexico, and Argentina, Peru, Colombia, Chile. Annexed Table A brings the results of these calculations for engineering industries' products. In view of trade flows, four basic views are established in the table:

- A. More than 25 per cent of exports in the commodities concerned are channelled into developing countries;
- B. more than 50 per cent, but less than 75 per cent of exports are directed to developing countries;
- C. the same as B, directed to other developing countries;
- D. more than 75 per cent of exports channelled into other developing countries.

Out of the 11 developing countries analyzed by I. Murakami, Japan, Mexico and Republic of Korea appear most often as exporting major portion of various commodities of goods to the markets of developed countries. Preferentially, however, the exports of engineering items from these developing countries are largely directed to the markets of other developing countries (categories C and D in Table A).

Available imports and exports figures for selected developing countries are summarized in Annexed Table 5. The export data reveal upward trend in time, although, compared with relevant import figures, they form in most countries a small fraction of the latter.

#### 1. Metalworking industries as export-oriented industries

The exportability of an engineering product is determined largely by two factors - quality and price (cost). The quality of an engineering product depends, to a large extent, on the quality of raw material inputs. Mechanical and technological properties of iron and steel materials are obviously particularly important in this respect. Tight control of incoming materials to an exporting metalworking plant, therefore, the first prerequisite.

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<sup>10</sup> See, Ichiro Murakami, Two aspects of the manufactured goods from developing countries, The Developing Economies, Vol. VI, September 1968, No. 3, Tokyo, Japan, pp. 261-283.

57. The first judgement upon the quality of an engineering product is based on a test as to whether the product fulfils the technical requirements placed on it. These requirements are, as a rule, set in the form of standard specifications. Keeping up to the international standards and norms is then the second precondition. Quality control at all stages of production process, represents the third precondition. Nowadays, world-wide trends in carrying out quality control in engineering move towards the application of statistical planning, supervision and improving the quality of the goods produced, as distinct from the conventional methods where finished components and products are sorted into good and defective pieces. Packing and packaging of export products too deserve serious attention by the manufacturers.

58. Since the cost of an engineering product is a function of productivity, productivity measures have to be introduced into the whole production process. It should be planned by production planning, controlled by production control and checked by cost control. The experience shows that the process planning, in many developing countries, is left virtually to the discretion of the workers or supervisors. Production shops lay-out, transport problems, volume of material stocks etc., are sometimes considered minor factors, though rationalization programmes in these fields could result in substantial savings in material costs and overheads.

59. In the case of machine tools and transport equipment specifically, an additional requirement is associated with service facilities for the products to be exported. Even a first-class machine cannot be exported if the buyer is not convinced of the ability of the exporter to provide satisfactory after-sales servicing, together with the machines or equipment.

60. However, even if every effort is made within the plant to produce a good export product, other obstacles to successful exporting may arise; while these are out of the scope of this paper, they should be nevertheless mentioned. Ex-plant obstacles may relate to a developing country's lack of infrastructural services, or to administrative acts controlling export business, or to the lack of incentives, and finally to a variety of obstacles restricting the access to a foreign market.

61. Knowledge of the distribution chain in the foreign country is also of importance, especially in exporting machine tools. While in most engineering products, the distribution chain is usually exporter-importer-agent-wholesaler-retailer, in case of machine tools, most importers sell directly to the final users and only occasionally use the services of local agents.
62. To meet the requirements briefly outlined in this section may prove difficult to many developing countries. Some of them have already proved, however, that in some branches it is possible. Moreover, this seems to be the only way in which the developing countries may take more active part in satisfying the very dynamic world demand for engineering goods. This dynamic may be illustrated, for instance, on growth of apparent consumption of engineering goods between 1956-1966 in European member countries of OEEC (annexed table 6), and estimates of engineering production, imports and consumption in developing regions in 1975 (Table 7).

### 3. Policy for the Future

- 3.1: Export-orientation component combined with import substitution efforts
63. The process of industrialization has a definite agglomerative and self-reinforcing quality. It is, therefore, a matter of great importance that it starts and continues to grow at the best possible and follows such a trend that enables the various activities given circumstances and conditions. The industrialization policies of the developing countries have tended to concentrate upon import substitution under strong protection of local industries. It is unlikely, however, that import substitution alone would transform a developing country into an industrial power competitive in the world markets of manufactured products.
64. This is not to say that import substitution policies have no place in the industrialization process of developing countries. They do represent a means of building up domestic production, while benefiting at the same time does relief from the pressures of the balance of payments. However, if industrialization is to proceed at a faster rate than the expansion of usually limited domestic market for manufactured products, and in a more economical way, the export-oriented component should be built in the industrialization programme from its early stages of implementation so that when gradually expanding, it forms a significant part of the market for domestic industrial products.



65. It would be unrealistic to believe that the developing countries with their own national resources of technology can enter into the production of the most sophisticated branches on equal terms with the advanced countries. An analysis of trade flows in engineering goods reveals, however, that among the products traded there are many fairly simple final products and components and parts for more complex final products than can be produced in developing countries.

66. A high degree of specialization is necessary if export-oriented development of metalworking industries is to be embarked upon. No small country, and not only a developing one, can support technological and technical progress over the whole spectrum of metalworking industries. "The high degree of specialization implied in a pronounced export orientation of industrial development undoubtedly carries a considerable risk, for the economy as a whole and even more for individual producers. The real alternative, however, is not a similar degree of industrial development with less risk, but the acceptance of a slower rate of industrialization". <sup>13</sup>

67. One obvious possibility in enlarging the market for metalworking industries of developing countries is sub-regional or regional co-operation of the latter. If such a regional co-operation assumes itself an export-oriented region and involves a large enough combined market, it would certainly represent a significant step forward. So far, however, regional co-operation efforts by developing countries have brought only limited results in this particular aspect.

68. It is evident that if the developing countries are to come closer to an export-oriented industrialization, important measures are required in the developing countries themselves, in the industrially advanced countries and in international co-operation.

### 3.2: Possible areas of assistance by developed countries

#### 3.2.1. Transfer of technology and know-how

69. Technical problems in the metalworking industries are obviously very pressing, especially in those developing countries who have already reached some level in the development of such industries. Discussions are still going on among the economists with regard to the alternatives between labour-intensive or capital-intensive techniques. No single formula

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<sup>13</sup> The need for export-oriented patterns of industrialization, International Symposium on Industrial Development, Athens, 1967.

could possibly be prescribed for all cases. Obviously, attention should be paid to serious economic and social problems of automation in the developing countries and technologies of developed countries are to be adapted to local conditions if transferred to developing countries. If an export-oriented pattern is adopted as an objective, however, progressive technology may be the only way to achieve competitive position on the world markets.

### 3.2.2. Subcontracting, joint ventures and similar arrangements

70. Subcontracting among firms in developed and developing countries may be one of the relatively easy ways of export-oriented pattern in the metalworking industries in the developing countries. In fact, many developed firms found it useful to reach for the developing countries for the supply of parts or components for their final products. This is usually performed according to the standards and specifications by the firms in developed countries. An element of know-how transfer is often implied in this process.

71. Joint ventures between the firms in developed and developing countries may also be conducive to exports from developing countries. This is, at present, however, not the case in most existing arrangements which are usually oriented exclusively towards the local market of a developing country concerned.

## 4. Possible Modes and Scope of Assistance by UNIDO in Planning and Programming of Metalworking as Potential Export Sector

### 4.1. Forms of assistance

72. It follows from the very nature of the present project that it may be particularly suitable for those developing countries that have already reached a certain level of their metalworking industries and are seriously determined to create favourable environments for increasing their effectiveness as well as their export potential.

73. Technical assistance activities that would be eventually initiated on the basis of the methodology developed would most probably take the form of major technical assistance projects. What would be involved is planning and programming or projections of the whole sector or its major branches, with a special view to export potential.

#### 4.2 Scope of assistance

74. Methodology developed, expertise available in IITD and outside, together with a set of data for the sector, will be put at the disposal of a developing country who will be interested in acquiring the technical assistance of the nature briefly outlined. Local experts shall participate in the work of the team throughout its stay in the developing country concerned.

75. The final product of such technical assistance projects may have different scope; from a set of measures or raising the effectiveness of the sector or branch with a view to its export orientation, through an advice as to what product assignments are likely to be most profitable for exports under existing conditions, to a complete programme for planning the sector with an in-built export orientation. The latter while starting from the analysis of the present status of the sector, may bring about recommendations as to the change of the structure of the whole sector and would be therefore bound to exert substantive influence on the whole industrial set-up of the country due to the widespread linkages of the sector.

**TABLE 1. PERCENTAGE CHANGES IN EXPORTS OF SELECTED COMMODITIES, BY REGION, 1960-1966**

1960-1966

(Annual change in value in millions between the dates indicated)

	Food Agriculture and Tobacco	Mineral Products	Paper and Paper Products	Chemicals Petroleum and Coal Products	Other Commodities	Total
	1960-61	1960-61	1960-61	1960-61	1960-61	1960-61
<b>Developing economies<sup>a</sup></b>						
1960 and 1961	5	0	13	7	1	17
1961 and 1962	2	1	10	7	0	11
1962 and 1963	3	1	8	0	0	12
1963 and 1964	4	0	8	0	0	12
1964 and 1965	7	3	7	4	2	23
1965 and 1966	7	0	19	7	9	42
<b>Latin America</b>						
1960 and 1961	5	5	10	0	9	29
1961 and 1962	3	-2	5	2	4	12
1962 and 1963	2	0	7	4	9	22
1963 and 1964	1	7	5	7	12	27
1964 and 1965	7	0	7	0	0	14
1965 and 1966	4	2	-	-	12	18
<b>Asia</b>						
1960 and 1961	0	3	0	0	-1	2
1961 and 1962	2	4	0	10	20	36
1962 and 1963	1	7	10	10	12	40
1963 and 1964	6	0	0	13	9	38
1964 and 1965	9	4	7	5	4	39
1965 and 1966	13	-2	9	0	12	32
<b>Developed or pre-economic</b>						
1960 and 1961	4	3	5	7	1	20
1961 and 1962	4	5	5	10	1	25
1962 and 1963	4	5	0	9	4	22
1963 and 1964	4	5	0	10	10	39
1964 and 1965	3	4	4	0	4	15
1965 and 1966	1	6	0	11	2	19
<b>World, excluding centrally planned economies</b>						
1960 and 1961	4	3	6	7	1	21
1961 and 1962	4	0	0	10	3	17
1962 and 1963	4	5	4	0	4	17
1963 and 1964	4	5	0	10	13	32
1964 and 1965	3	4	4	0	4	15
1965 and 1966	4	4	0	10	2	20

<sup>a</sup> Includes data for Africa (excluding South Africa) which are not shown separately.

<sup>b</sup> Reconstructed from data for the first nine months of 1965 and the corresponding period of 1966.

Source: United Nations, Department of Economic and Social Affairs, Secretariat, *World Economic Survey, 1967*, Table 1.1.

**TABLE 2. TRADE (TOTAL, EXPORT, IMPORTATION) - MANUFACTURING**

IN PERCENT OF GROSS DOMESTIC PRODUCT

1965

	Population -	Trade Domestic	Manufacturing	Business
	1965	1965	1965	1965
<b>Export</b>	<b>19%</b>	<b>15%</b>	<b>2%</b>	<b>2.2</b>
North America	4.1	6.0	1.8	2.1
Others	14.9	9.1	0.2	0.1
<b>Latin America</b>	<b>17%</b>	<b>12%</b>	<b>3%</b>	<b>5.2</b>
Free Trade Area	11.9	16.0	16.0	51.5
of which:				
Brazil	4.9	1	1	17.6
Mexico	2.8	1-29.7	1-14.0	12.8
Argentina	1.5	1	1	11.1
Others	3.2	7.9	6.0	2.7
<b>Latin - Free and South East</b>	<b>17%</b>	<b>11%</b>	<b>17%</b>	<b>16.8</b>
of which:				
Latin	11.0	19.5	20.9	20.8
<b>World East</b>	<b>2%</b>	<b>3%</b>	<b>2%</b>	<b>0.1</b>
<b>Total Developing Countries</b>	<b>36%</b>	<b>28%</b>	<b>5%</b>	<b>100</b>
(excl. S. Europe)				

\* rounded. Sources: IMF document 18/517 1/2 and other IMF sources.

TAR 1-1-72  
 FEDERAL BUREAU OF INVESTIGATION  
 REPORT OF THE DIRECTOR  
 TO THE ATTORNEY GENERAL  
 RE: [REDACTED] (VALUED AT \$1,000,000,000)

Reporting Agency	1971	1970	1969	1968	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	1956	1955	1954	1953	1952	1951	1950	1949	1948	1947	1946	1945	1944	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929	1928	1927	1926	1925	1924	1923	1922	1921	1920	1919	1918	1917	1916	1915	1914	1913	1912	1911	1910	1909	1908	1907	1906	1905	1904	1903	1902	1901	1900	1899	1898	1897	1896	1895	1894	1893	1892	1891	1890	1889	1888	1887	1886	1885	1884	1883	1882	1881	1880	1879	1878	1877	1876	1875	1874	1873	1872	1871	1870	1869	1868	1867	1866	1865	1864	1863	1862	1861	1860	1859	1858	1857	1856	1855	1854	1853	1852	1851	1850	1849	1848	1847	1846	1845	1844	1843	1842	1841	1840	1839	1838	1837	1836	1835	1834	1833	1832	1831	1830	1829	1828	1827	1826	1825	1824	1823	1822	1821	1820	1819	1818	1817	1816	1815	1814	1813	1812	1811	1810	1809	1808	1807	1806	1805	1804	1803	1802	1801	1800	1799	1798	1797	1796	1795	1794	1793	1792	1791	1790	1789	1788	1787	1786	1785	1784	1783	1782	1781	1780	1779	1778	1777	1776	1775	1774	1773	1772	1771	1770	1769	1768	1767	1766	1765	1764	1763	1762	1761	1760	1759	1758	1757	1756	1755	1754	1753	1752	1751	1750	1749	1748	1747	1746	1745	1744	1743	1742	1741	1740	1739	1738	1737	1736	1735	1734	1733	1732	1731	1730	1729	1728	1727	1726	1725	1724	1723	1722	1721	1720	1719	1718	1717	1716	1715	1714	1713	1712	1711	1710	1709	1708	1707	1706	1705	1704	1703	1702	1701	1700	1699	1698	1697	1696	1695	1694	1693	1692	1691	1690	1689	1688	1687	1686	1685	1684	1683	1682	1681	1680	1679	1678	1677	1676	1675	1674	1673	1672	1671	1670	1669	1668	1667	1666	1665	1664	1663	1662	1661	1660	1659	1658	1657	1656	1655	1654	1653	1652	1651	1650	1649	1648	1647	1646	1645	1644	1643	1642	1641	1640	1639	1638	1637	1636	1635	1634	1633	1632	1631	1630	1629	1628	1627	1626	1625	1624	1623	1622	1621	1620	1619	1618	1617	1616	1615	1614	1613	1612	1611	1610	1609	1608	1607	1606	1605	1604	1603	1602	1601	1600	1599	1598	1597	1596	1595	1594	1593	1592	1591	1590	1589	1588	1587	1586	1585	1584	1583	1582	1581	1580	1579	1578	1577	1576	1575	1574	1573	1572	1571	1570	1569	1568	1567	1566	1565	1564	1563	1562	1561	1560	1559	1558	1557	1556	1555	1554	1553	1552	1551	1550	1549	1548	1547	1546	1545	1544	1543	1542	1541	1540	1539	1538	1537	1536	1535	1534	1533	1532	1531	1530	1529	1528	1527	1526	1525	1524	1523	1522	1521	1520	1519	1518	1517	1516	1515	1514	1513	1512	1511	1510	1509	1508	1507	1506	1505	1504	1503	1502	1501	1500	1499	1498	1497	1496	1495	1494	1493	1492	1491	1490	1489	1488	1487	1486	1485	1484	1483	1482	1481	1480	1479	1478	1477	1476	1475	1474	1473	1472	1471	1470	1469	1468	1467	1466	1465	1464	1463	1462	1461	1460	1459	1458	1457	1456	1455	1454	1453	1452	1451	1450	1449	1448	1447	1446	1445	1444	1443	1442	1441	1440	1439	1438	1437	1436	1435	1434	1433	1432	1431	1430	1429	1428	1427	1426	1425	1424	1423	1422	1421	1420	1419	1418	1417	1416	1415	1414	1413	1412	1411	1410	1409	1408	1407	1406	1405	1404	1403	1402	1401	1400	1399	1398	1397	1396	1395	1394	1393	1392	1391	1390	1389	1388	1387	1386	1385	1384	1383	1382	1381	1380	1379	1378	1377	1376	1375	1374	1373	1372	1371	1370	1369	1368	1367	1366	1365	1364	1363	1362	1361	1360	1359	1358	1357	1356	1355	1354	1353	1352	1351	1350	1349	1348	1347	1346	1345	1344	1343	1342	1341	1340	1339	1338	1337	1336	1335	1334	1333	1332	1331	1330	1329	1328	1327	1326	1325	1324	1323	1322	1321	1320	1319	1318	1317	1316	1315	1314	1313	1312	1311	1310	1309	1308	1307	1306	1305	1304	1303	1302	1301	1300	1299	1298	1297	1296	1295	1294	1293	1292	1291	1290	1289	1288	1287	1286	1285	1284	1283	1282	1281	1280	1279	1278	1277	1276	1275	1274	1273	1272	1271	1270	1269	1268	1267	1266	1265	1264	1263	1262	1261	1260	1259	1258	1257	1256	1255	1254	1253	1252	1251	1250	1249	1248	1247	1246	1245	1244	1243	1242	1241	1240	1239	1238	1237	1236	1235	1234	1233	1232	1231	1230	1229	1228	1227	1226	1225	1224	1223	1222	1221	1220	1219	1218	1217	1216	1215	1214	1213	1212	1211	1210	1209	1208	1207	1206	1205	1204	1203	1202	1201	1200	1199	1198	1197	1196	1195	1194	1193	1192	1191	1190	1189	1188	1187	1186	1185	1184	1183	1182	1181	1180	1179	1178	1177	1176	1175	1174	1173	1172	1171	1170	1169	1168	1167	1166	1165	1164	1163	1162	1161	1160	1159	1158	1157	1156	1155	1154	1153	1152	1151	1150	1149	1148	1147	1146	1145	1144	1143	1142	1141	1140	1139	1138	1137	1136	1135	1134	1133	1132	1131	1130	1129	1128	1127	1126	1125	1124	1123	1122	1121	1120	1119	1118	1117	1116	1115	1114	1113	1112	1111	1110	1109	1108	1107	1106	1105	1104	1103	1102	1101	1100	1099	1098	1097	1096	1095	1094	1093	1092	1091	1090	1089	1088	1087	1086	1085	1084	1083	1082	1081	1080	1079	1078	1077	1076	1075	1074	1073	1072	1071	1070	1069	1068	1067	1066	1065	1064	1063	1062	1061	1060	1059	1058	1057	1056	1055	1054	1053	1052	1051	1050	1049	1048	1047	1046	1045	1044	1043	1042	1041	1040	1039	1038	1037	1036	1035	1034	1033	1032	1031	1030	1029	1028	1027	1026	1025	1024	1023	1022	1021	1020	1019	1018	1017	1016	1015	1014	1013	1012	1011	1010	1009	1008	1007	1006	1005	1004	1003	1002	1001	1000	999	998	997	996	995	994	993	992	991	990	989	988	987	986	985	984	983	982	981	980	979	978	977	976	975	974	973	972	971	970	969	968	967	966	965	964	963	962	961	960	959	958	957	956	955	954	953	952	951	950	949	948	947	946	945	944	943	942	941	940	939	938	937	936	935	934	933	932	931	930	929	928	927	926	925	924	923	922	921	920	919	918	917	916	915	914	913	912	911	910	909	908	907	906	905	904	903	902	901	900	899	898	897	896	895	894	893	892	891	890	889	888	887	886	885	884	883	882	881	880	879	878	877	876	875	874	873	872	871	870	869	868	867	866	865	864	863	862	861	860	859	858	857	856	855	854	853	852	851	850	849	848	847	846	845	844	843	842	841	840	839	838	837	836	835	834	833	832	831	830	829	828	827	826	825	824	823	822	821	820	819	818	817	816	815	814	813	812	811	810	809	808	807	806	805	804	803	802	801	800	799	798	797	796	795	794	793	792	791	790	789	788	787	786	785	784	783	782	781	780	779	778	777	776	775	774	773	772	771	770	769	768	767	766	765	764	763	762	761	760	759	758	757	756	755	754	753	752	751	750	749	748	747	746	745	744	743	742	741	740	739	738	737	736	735	734	733	732	731	730	729	728	727	726
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**TABLE 4 : EXPORT FLOWS PATTERNS FROM SELECTED DEVELOPING COUNTRIES ON THE BASIS OF A THREE-DIGIT SITC CODE**

<u>SITC Commodity</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
691 Structures and parts nes	COL			IND, TAI, MEX, BRAZ
692 Metal tanks, boxes, etc.	COL	MEX	PERU	IND, BRAZ.
693 Wire products, non electr		MEX		TAI, KOR, PERU
694 Steel, copper nails, nuts etc.				
695 Tools				IND, TAI
696 Cutlery	TAI, PAK	PAK, KOR		IND, TAI, MEX, BRAZ
697 Base metallic household equipment		KOR, THAI, BRAZ	IND, COL	MEX
698 Metal manufactures	KOR		MEX	IND, PAK, ARG. COL.
	KOR, CHIL	MEX	TAI	IND, TAI, PAK, BRAZ, ARG. COL.
711 Power machinery wood	PAK, MEX			ARG. COL.
712 Agric. machinery	PAK	MEX		IND, TAI, KOR, BRAZ
714 Office machines	MEX			KOR, BRAZ, COL
715 Metalworking machinery	PAK		BRAZ	IND
717 Textile, leather machinery	PAK		BRAZ	TAI, ARG.
718 Machines for special ind.	KOR	KOR	IND, MEX	TAI, BRAZ
719 Machines nes non electr.	PHIL	PAK	BRAZ, COL	TAI, MEX
720 Elec. power mach. switch gear			PAK, KOR, MEX	TAI, BRAZ, ARG. COL
723 Electr. distributing mach.			MEX	TAI, KOR, BRAZ
724 Telecommunications equip.	TAI, KOR	MEX		TAI, MEX
725 Domestic electr. equip.			BRAZ	ARG
729 Electr. mach. nes	KOR			TAI, MEX, BRAZ, ARG
731 Railway vehicles			PAK, ARG	TAI, THAI, MEX, BRAZ
732 Road motor vehicles	PAK	MEX		TAI, BRAZ, CHIL
733 Road non-motor vehicle		BRAZ	KOR	IND, TAI, BRAZ, ARG
734 Aircraft	IND, PAK, KOR, MEX, BRAZ			IND, TAI
735 Ships and boats				TAI, MEX, BRAZ, PERU, CHIL
712 Plumbing, heating, lighting equipment			TAI	IND, PAK, MEX, COL.

Explanations:

ARG	Argentina	IND	India	PHIL	The Philippines
BRAZ	Brazil	KOREA	Republic of Korea	PERU	Peru
COL	Colombia	MEX	Mexico	TAI	China (Taiwan)
CHIL	Chile	PAK	Pakistan	THAI	Thailand

A. B. C. D. - see para 53, page 18.

**TABLE 5 : EXPORTS AND IMPORTS OF ENGINEERING PRODUCTS FOR SELECTED**

**NEWSPHERE COUNTRIES**

(Value in US\$ million unless otherwise stated)

Country	Year	Exports, P.O.S.		Imports, U.S.P.	
		1961	1962	1961	1962
YUGOSLAVIA (mil. dinars)	60	23.7	24.0	169.0	189.1
	7	85.9	104.6	4,777.4	4,990.7
	86	21.6	19.0	107.6	88.9
	Total	131.2	147.6	4,954.0	5,178.7
ARGENTINA	60	2.9	2.7	7.7	7.1
	7	18.8	16.7	162.7	302.3
	86	1.0	0.7	18.2	18.8
	Total	22.7	20.1	188.6	328.2
BRAZIL	60	-	-	28.78	21.05
	7	18.27	28.88	308.73	304.35
	86	-	-	28.04	22.71
	Total	18.27	28.88	365.55	348.11
MEXICO (mil. pesos)	60	106.32	105.04	768.08	977.37
	7	168.68	148.83	2,401.87	2,475.19
	86	-	-	531.12	572.68
	Total	275.00	253.87	3,701.07	3,925.24
PARAGUAY (mil. guasas)	60	7.4	6.4	141.8	177.1
	7	12.8	21.0	11,530.0	1,848.1
	86	4.0	0.0	87.7	68.6
	Total	24.2	27.4	11,759.5	2,093.8
CHILE (mil. pesos de 64 cop)	60	-	-	80.84	100.10
	7	8.06	7.47	405.84	1,076.14
	86	-	-	31.02	11.27
	Total	8.06	7.47	517.70	1,187.51
COLOMBIA	60	-	-	14.72	4.00
	7	1.84	2.08	247.82	408.80
	86	-	-	11.18	8.44
	Total	1.84	2.08	273.72	411.24
VENEZUELA (mil. bolivares)	60	-	-	979.8	269.7
	7	-	-	1,364.1	2,182.7
	86	-	-	118.0	142.0
	Total	-	-	2,461.9	2,594.4
IRAN (mil. rials)	60	-	-	1,440.1	-
	7	26.4	-	14,944.1	-
	86	-	-	843.9	-
	Total	26.4	-	17,228.1	-
INDONESIA	60	-	-	25.83	23.30
	7	0.77	0.84	267.52	261.60
	86	-	-	6.98	9.30
	Total	0.77	0.84	290.33	294.20
UNITED ARAB EMP. (mil. Dir. qatari)	60	-	-	14.17	7.68
	7	0.22	0.48	108.91	21.72
	86	-	-	3.74	2.07
	Total	0.22	0.48	126.82	31.47



TABLE 6

INDEX OF IMPORTATION AND EXPORTS TO THE HOME MARKET 1954  
(VALUES IN CURRENT UNITED STATES DOLLARS)

Index: Value in 1951 = 100

Exports (S.I.U. 20)		1954	1957	1958	1959	1960	1961	1962	1962 <sup>a</sup>	1963	1964
Machinery other than electric (S.I.U. 71)	a)	117	144	141	153	177	202	19	201	222	261
	b)	12	143	143	143	217	272	201	235	225	145
Electrical machinery, apparatus and appliances (S.I.U. 72)	a)	111	144	136	144	202	246	252	262	262	261
	b)	160	121	127	146	172	19	652	662	742	211
Transport equipment (S.I.U. 73)	a)	104	122	141	157	174	192	211	217	231	212
	b)	124	122	118	117	147	172	172	185	163	102
Manufactures of Metal, n.e.c. (S.I.U. 74)	a)	112	15	154	157	175	185	106	100	211	167
	b)	125	134	137	147	171	171	110	165	135	112
Precision instruments, watches and clocks (S.I.U. 76)	a)	104	123	136	139	147	196	105	212	215	266
	b)	23	142	166	167	201	224	163	171	274	73

(a) Production for the Home market

(b) Imports from third countries

(c) Since 1962<sup>a</sup> - including Spain

Source: 1967, Page 1266

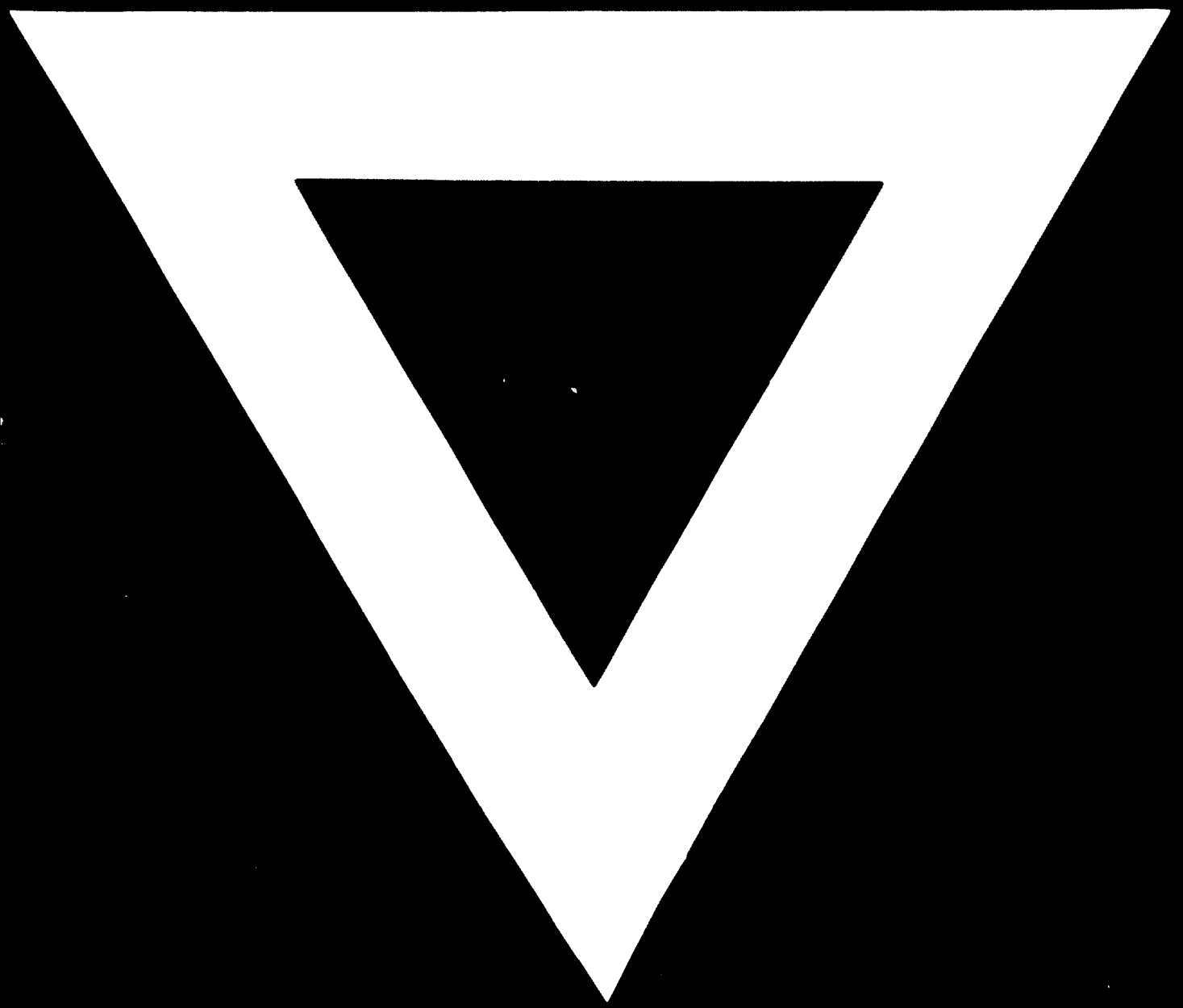
**TABLE 7. ESTIMATES OF ENGINEERING PRODUCTION, EXPORTS AND CONSUMPTION BY 1975 - DEVELOPING REGIONS**

	South/ South-East Asia	Latin America	Africa	Middle East	All developing countries
<b>Gross Domestic Product</b>					
<i>1/</i> Growth per annum (1965-75)	5-6	5-6	5-6	5-6	5-6
<b>Engineering Industry</b>					
<i>Value added<sup>2/</sup></i>					
- 1965	2.8	4.2	0.5	0.1	7.6
- 1975	11	16	1.4	0.3	29
- % growth per annum	15	14	11	-	14
<b>Net Exports</b>					
- 1965	2.4	3.7	2.4	0.6	10.1
- 1975	3	5	4.2	1.0	13.2
- % growth per annum	-	3	6	-	2.7
<b>Investment</b>					
- 1965	8.9	12.1	3.3	0.7	25
- 1975	25	32	6.5	1.3	65
- % growth per annum	11	10	7	6	10
<b>Consumption Per Capita</b>					
- 1965	10	49	12	29	17
- 1975	21	105	19	40	35
- % growth per annum	8	8	5	3	7

*2/* Gross production is approximately double value added.

Source: UNCTAD document TD/CONF.1/2





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