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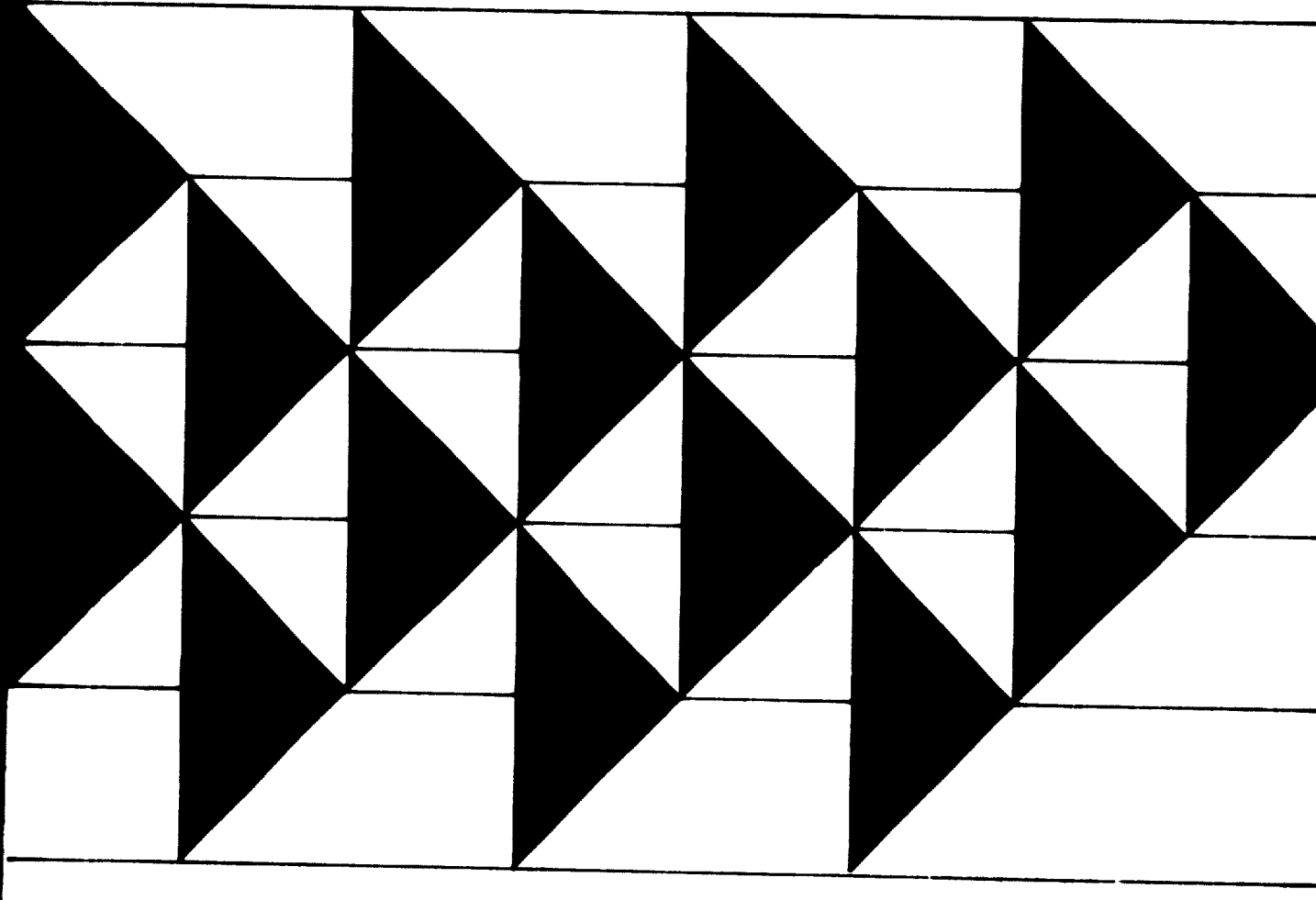
INDUSTRIAL DEVELOPMENT SURVEY

VOLUME IV



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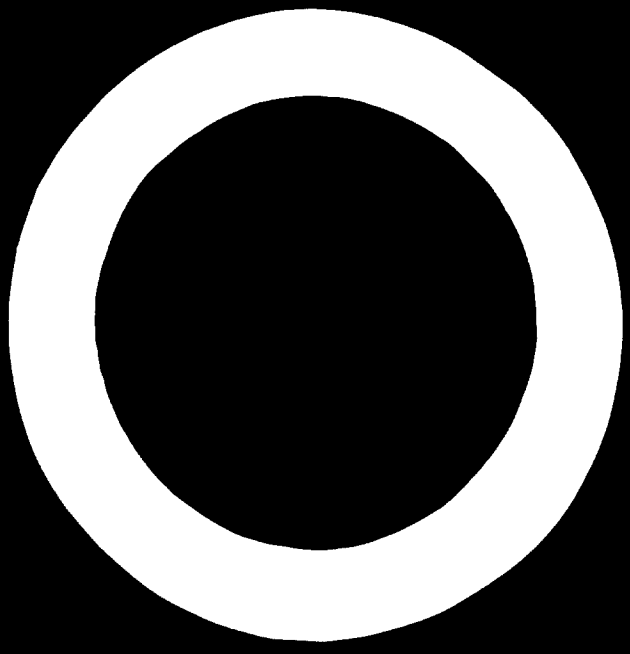

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United Nations Industrial Development Organization

INDUSTRIAL DEVELOPMENT SURVEY

VOLUME IV

SUMMARY

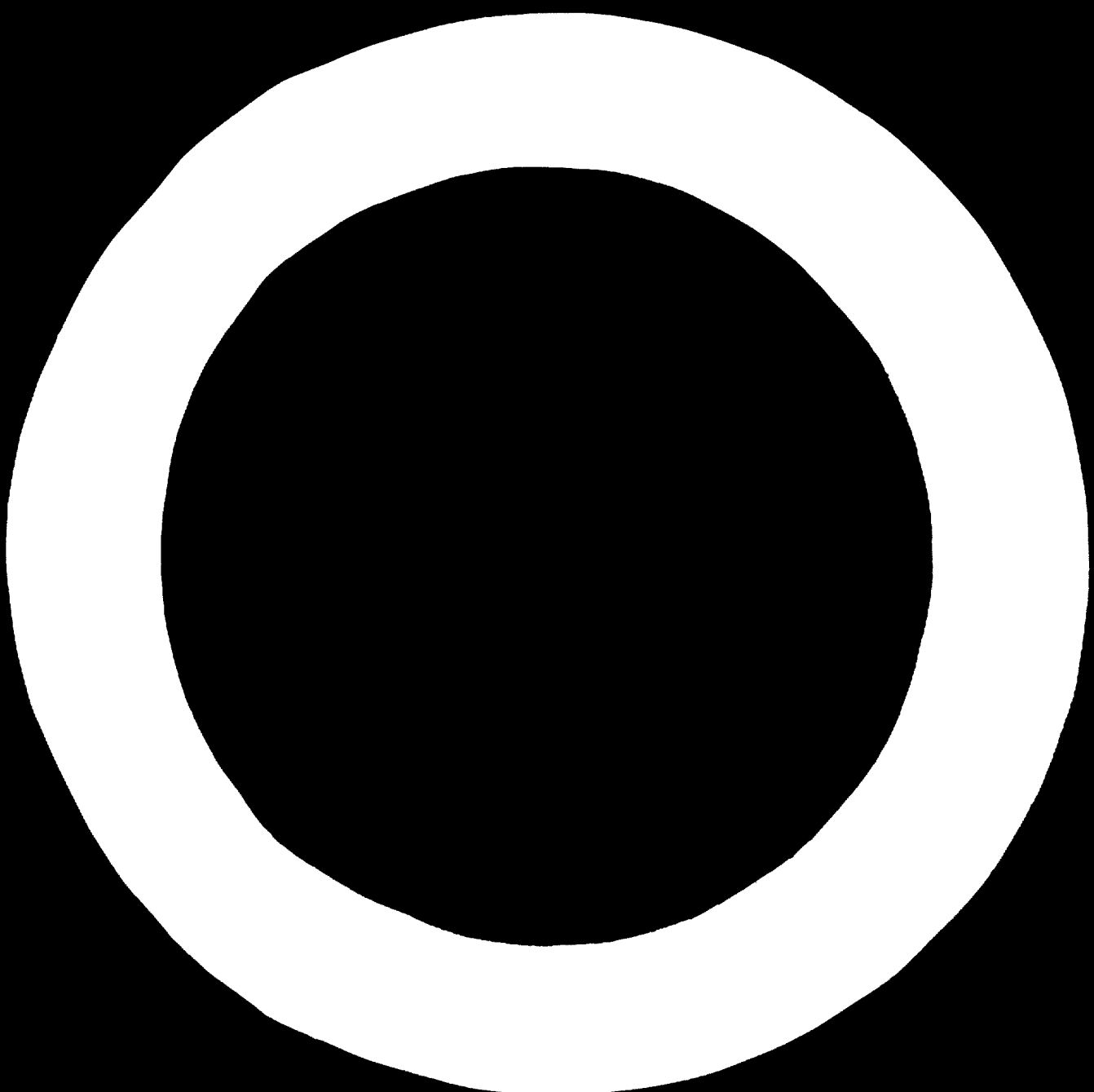
1. The Industrial Development Survey each year interprets the latest available statistical data on industrial development and presents some analyses based on this information. It also comments on current issues in this field.

I. RECENT TRENDS IN THE DEVELOPMENT OF MANUFACTURING

2. Manufacturing output in the developing countries and the developed market economies recovered in 1968 and 1969 from a sharp decline in growth during 1967, but this momentum did not continue into 1970. In the same period, manufacturing in the centrally planned economies continued to grow at high rates without a noticeable fluctuation, except in 1969.

3. For the longer period 1960-1969, the centrally planned economies led the other economic groupings with an annual growth rate for the output of manufacturing of 8.6 per cent. The developing countries as a whole recorded an average of 6.4 per cent, a rate slightly higher than the rate of 6 per cent for the developed market economies. Among the developing regions, Asia led with a rate of 7 per cent, while Latin America and Africa recorded rates of only 5.7 and 3.9 per cent respectively. These regional growth rates for manufacturing were influenced partly by the relatively poorer performance of a few large manufacturing producers among the developing countries. It would not be misleading therefore to state that more than half of the developing countries registered growth rates that exceeded the average for their regions.

4. The average annual growth rates of per capita manufacturing output for 1960-1968 were 7.4 per cent for the centrally planned economies, 5.2 per cent for the develcped



market economies, but only 3.6 per cent for the developing countries. The rapid growth of population in the developing countries accounts for this striking reversal in their ranking referred to in paragraph 3.

5. To meet the 5 per cent target growth rate for GDP set for the United Nations First Development Decade (1961-1970), it was estimated that the manufacturing sector should have grown at an average annual rate of about 7 per cent. This target was reached only in Asia. For the Second Development Decade, the target for the growth rate of manufacturing is 8 per cent for the first half and higher for the second half. A greater effort will be necessary to achieve these targets.

6. Target growth rates for manufacturing and GDP set by most developing countries in their national plans were even higher than those established by the First Development Decade. Among 18 countries for which data are available for the 1960s, only two exceeded their planned growth rates for manufacturing and GDP. Sri Lanka and Jordan exceeded their target rates for manufacturing but fell short of the targets for GDP. The other 14 countries were unable to reach either target. When the goals of the First Development Decade are applied (5 per cent for GDP and 7 per cent for manufacturing), slightly more than half of these 17 countries were successful.

7. The manufacturing sector contributed an average of 22 per cent to the over-all growth of GDP in developing countries between 1960 and 1968, and its relative importance in the economy was increasing. The contribution of agriculture was second, but the relative importance of this sector was steadily declining. The contribution of manufacturing to the increase in GDP was 28 per cent in Latin America and 22 per cent in Asia, while in Africa - because of the small size of this sector in this region - it was only 9 per cent.

8. It has often been argued that industrialization should act to stabilize income levels in countries traditionally dependent on fluctuating exports of primary commodities. The data on growth of industrial output and GDP show that in some countries this has been true, although in others it has not. In any event, the size of manufacturing in the greater number of developing countries is still so small that it cannot yet exert a stabilizing influence on these countries.

9. An attempt was made to gauge the influence of several related factors on the rate of industrialization, including (1) the growth rate of GDP, (2) the growth of per capita GDP, (3) the growth of agricultural output, (4) the growth of total exports, (5) the percentage enrollment in secondary school of the relevant age group, and (6) the growth of domestic capital formation. The principal finding was that the growth in manufacturing is statistically much more closely associated with a weighted composite variable encompassing all of the above factors than with any of these factors singly. This implies that packages of economic and social policies with a simultaneous impact on a range of these factors will mutually reinforce each other's effectiveness in stimulating more rapid growth.

10. Among the major groups of manufacturing industries, those with the fastest growth rates between 1960-1969 in the developing countries were metal products (8.3 per cent), chemicals and basic metals (7.9 per cent), and non-metallic mineral products (7.3 per cent). It seems clear that these industries will continue to have the greatest growth potential, although in the Asian region the wood products and furniture industry and the wearing apparel, leather and foot-wear industries ranked ahead of chemicals and non-metallic mineral products.

11. High elasticities of output with respect to per capita income were evident for paper and paper products, chemicals (especially paint, soap and drugs), rubber products, plastic products, iron and steel products, machinery, and electrical and transport equipment. A developing country in the course of planning may stress manufacturing projects with high growth elasticities in preference to ones exhibiting low growth elasticities. For example, for each percentage increase in per capita GDP, the production of machinery has increased almost 2 per cent, while the output of processed food has gone up by only 1.2 per cent. Relatively large elasticities with respect to population growth were registered in the basic iron and steel, paper and paper products, chemicals, textiles, rubber products, glass and glassware products, metal products and electrical machinery and equipment industries.

12. High costs and low profitability appear to be restricting the further development in industrially advanced countries of the food-processing, textiles, wearing apparel and optical equipment industries, encouraging shifts

of these activities towards certain developing countries. However, this phenomenon does not yet seem to have occurred in some other manufacturing branches assumed to be relatively labour-intensive, because firms in the developed countries have evolved cost-reducing techniques of a more capital-intensive nature. The transfer of production, therefore, does not seem to take place as a matter of course.

II. FOREIGN TRADE AND INDUSTRIALIZATION

13. The developing countries increased their share of world manufactured exports from 5.5 to 6.7 per cent in the decade 1960-1969, although world exports of manufactures were growing rapidly. The expansion was especially rapid in light manufactures included in SITC commodity group 6 and 8. This advance was in contrast to the decline of the developing countries' position in total world trade. If their relative share of the market for manufactured exports had not increased, their share of total exports would have deteriorated still further. If these trends continue, more than one third of the export earnings of the developing countries will be provided by manufactures by the end of the Second Development Decade. It must be recognized, however, that a few countries account for most manufactured exports from the developing regions. In fact, some 15 countries, each of which exported manufactures valued at more than $100 million annually, accounted for about 80 per cent of the developing countries' total exports of manufactures.

14. In 1960, nearly 30 per cent of the manufactured exports of the developing countries went to other developing countries; by 1969 this figure had declined to 25 per cent. The developed market economies received about 71 per cent in 1969 as compared with about 67 per cent in 1960. The centrally planned economies imported 3.5 per cent compared with 2.5 per cent in 1960. Only Latin America reduced its dependence on exports to the developed market economies during the 1960s (from 87 to 71 per cent); its exports to developing countries (largely within its own region) nearly tripled (see paragraph 20 below). The pattern of manufactured exports from Asia and Africa evidenced a certain rigidity, and the decline in the share of these exports going to other developing countries signified a lack of complementarity and specialization in the industrial structure among the countries of these regions.

15. As regards imports, it seems logical that developing countries should achieve greater self-sufficiency in light manufactures (which are included in SITC 6 and 8) as development progresses. Until a high degree of industrialization is reached, however, imports of machinery and transport equipment and possibly of chemicals might be expected to increase relative to total imports. The data for 1960-1969 support this supposition. Imports of chemicals increased from 7.7 to 9 per cent of the developing countries' total imports; and imports of machinery and transport equipment from 28.9 to 33.6 per cent. For other manufactures (SITC 6 and 8), however, the proportion decreased from 28.4 to 26.7 per cent.

16. Eighteen countries have agreed to grant generalized tariff preference to imports from the developing countries under the General Scheme of Preferences. Among them, countries of the European Economic Community (EEC), Japan, the Nordic countries (Denmark, Finland, Norway and Sweden, which have made a joint offer known as the offer of the Nordic countries), the United Kingdom of Great Britain and Northern Ireland and the United States of America envisage duty-free importation of most products classified in chapters 25-99 of the Brussels Tariff Nomenclature (BTN), which include most manufactured items. The other countries provide for tariff reductions on these categories. Several countries have excepted certain product categories from the scheme. Moreover, the Nordic countries, the United Kingdom and the United States also propose duty-free entry of many items in BTN chapters 1-24 (primary products, some partly processed). The EEC is not eliminating tariffs for the latter category owing to its special preferences for associated overseas countries. Certain countries, for instance the countries of the EEC and Japan, have already put their preferences into effect. On the other hand, the United States has announced a delay in implementing them. The United Nations Industrial Development Organization (UNIDO), in co-operation with the United Nations Conference on Trade and Development (UNCTAD) and the General Agreement on Tariffs and Trade (GATT), is undertaking to assist the developing countries in exploiting the opportunities created by the new preferences.

17. In 1969, Latin America exported 14 per cent more partly processed primary products (excluding mineral fuels) than other manufactures. For Africa and Asia, on the contrary, exports in the latter category were 70 per cent and

...ent greater respectively than exports of processed primary goods. ...is, the manufactured exports of Asia should benefit the most from the estab... of trade preferences, because of the much greater relative importance ... this region of exports in BTN chapters 25-99.

... With the agreement reached on the Generalized Scheme of Preferences, ... turning to the effect of non-tariff barriers to trade. Recent ... pointed out that these barriers are particularly burdensome for ... ing countries. Since these countries usually lack the resources ... to combat the effects of non-tariff barriers, international organi... will provide assistance in this regard as an aid to new ... on.

... the potential for exports of manufactures by the least ... tries, attention is focused on present trade in partly processed ... Among these, exports of manufactured food and animal pro... important. (Exports of processed mineral fuels ranked second; ..., fact, partly refined petroleum products dominated.) Among pro... animal products, vegetable oil residues and cocoa butter and ... important for Africa; meat and meat preparations and refined ... dominated in Latin America; and processed shellfish, refined sugar ... fruit dominated this category of items exported from Asia.

... the effectiveness of regional economic integration with respect ... manufactures, trade data for Latin America are examined. It is ... Intra-Latin American trade in manufactures increased nearly ... over the decade, while imports from the developed countries rose ... only 6 ... cent. Intra-Latin American exports of manufactures increased ... 4% per ... of the developing countries' exports to Latin America in 1960 ... 31 per ... 1969. These changes make clear the new relationship emerging ... the Lat... American countries.

III. EMPLOYMENT IN THE FIRST AND SECOND DEVELOPMENT DECADES

... For the peri... -1965, manufacturing employment in the developing countries expanded at an average annual rate of 3.4 per cent. There is some evidence that the expansion slowed down gradually over these years. Manufacturing employment in the developed market economies grew at a consistently

slower rate (averaging 1.8 per cent in the 1960s), and it grew somewhat more slowly also in the centrally planned economies, except during the last sub-period. It must be remembered, however, that the industrially more advanced countries are now in a phase of development in which the share of manufacturing in total employment has more or less stabilized or is even declining.

13. Population and the labour force are increasing much more rapidly in the developing countries than in the more advanced regions. As a result, there is widespread and growing unemployment in many developing countries (frequently exceeding 10 per cent) and great pressure for jobs.

14. Despite the vital role of manufacturing in stimulating economic growth, this sector can create at best only a fraction of the jobs needed in the 1970s. It is still quite small in most developing countries. Furthermore, the expansion of manufactured output creates even smaller increases in employment because of increases in labour productivity in both new and pre-existing production lines, and also because of the gradual shift to making more capital-intensive goods. Each percentage increase in manufacturing output in the period 1960-1965 was associated with a rise of only 0.6 per cent in employment, and in 1965-1968, with a rise of 0.4 per cent.

15. It is often assumed that employment in the manufacturing sector, although the sector may be small, should expand more rapidly than employment in other non-agricultural pursuits. The data do not always support this belief. The information available on other non-agricultural sectors is far from complete, making it difficult to interpret the facts. Possibly the output of these sectors (for example, commerce, transport, construction etc.) has grown more rapidly than manufacturing output. The relatively low rate of growth in employment created directly by manufacturing is also explained by faster increases in labour productivity, as noted in the previous paragraph. Or it could be explained by differing practices governing the use of overtime in industry in contrast to the use of additional shifts or widening of capacity, which call for more employees.

16. Estimates of value added per person engaged in manufacturing in 1963 indicate that this figure for the developing countries was only about one sixth of that for the industrialized countries. This difference reflects, among other things, contrasting output mixes, widely diverse production

processes in each sector, generally less effective competition among firms in the developing countries, and fewer opportunities for economies of scale. Some industries in the developing countries had higher relative levels of labour productivity, but their limited scope is demonstrated by the fact that the ISIC two-digit industries, with a value added per person of at least 75 per cent of the average for the industrialized countries, accounted for only 1.1 per cent of the developing countries' total manufacturing employment. Industries in which labour productivity was at least 50 per cent as high had a share of employment of only 4.2 per cent.

26. The statistics suggest that the developing countries have attained smaller productivity increases since 1963 than the developed market or the centrally planned economies. The respective 1968 indices for these three economic groupings were 120, 127 and 138 (1963 = 100). Thus, the gap in labour productivity appears to have widened during the First Development Decade. It must be emphasized, however, that maximization of labour productivity itself is not a prime objective of development. The appropriateness of the production technique must rather be judged with reference to development objectives (income growth, employment creation, income distribution etc.) and the factor endowment in the respective country groupings.

27. The opinion is now widespread that the use of unduly capital-intensive, labour-saving techniques in manufacturing is encouraged by major distortions in the relative prices of these two factors compared with their "true social costs". Overvalued exchange rates combined with investment subsidies and excessive depreciation allowances usually make capital goods artificially cheap compared to locally made items. On the other hand, minimum wage laws and compulsory employee benefits often increase labour costs substantially. Any effect of such factor-price distortions on the actual level of employment, however, presupposes the existence of a variety of feasible techniques of production - some more labour-intensive and some less. Empirical evidence suggests that the scope for substantially more labour-intensive techniques in manufacturing is not wide and probably is less than in other sectors, such as agriculture and construction. None the less, a step-by-step analysis of production processes may indicate greater flexibility.

28. Finally, in considering the relatively low labour absorption in manufacturing, it must be noted that the expansion of factory-organized production

has supplanted some enterprises in the artisan sector. This displacement may stem from shifts of demand to factory-made products through urbanization, advertising or other forces, or from the competitive advantages of factory methods in efficiency and quality control. To retard the continuing decline in the labour intensity throughout industry and the displacement of artisans, the encouragement of greater selectivity in mechanizing factory functions and of subcontracting to the artisan sector, when practical, would be wise. Moreover, selective mechanization and upgrading of management in artisan enterprises would help them to survive. The establishment of institutions to provide technical, marketing and financial assistance to the artisan sector is needed to permit this sector to integrate with the faster-growing parts of the economy, including modern agriculture and services.

IV. INVESTMENT AND INDUSTRIALIZATION

29. One of the serious problems in analysing industrial development at the global or regional level is the lack of adequate data on manufacturing investment for most countries. It was established statistically, however, that the growth of investment in all machinery and transport equipment closely parallels that in manufacturing, even though this category includes some non-manufacturing capital. Thus, this variable was taken as an approximation.

30. As regards fixed capital formation, in Latin America 7 of the 14 countries with available data showed growth rates of over 10 per cent in the 1960s. The (unweighted) average for these countries, however, was only 8.2 per cent, reflecting the decline in capital formation in Argentina and Uruguay and its slow growth in Chile and Colombia. Judging from investment in machinery and transport equipment, industrialization was widespread in Latin America in the First Development Decade, in that this investment grew at more than 10 per cent per annum in 9 of the 14 countries.

31. The data for 9 Asian countries might give the impression that the growth of investment was higher in this region than in Latin America. The data, however, are heavily influenced by the performance of two countries with a very high growth of investment.

32. Three of the 8 African countries listed, namely Kenya, the Libyan Arab Republic and Zambia, had exceptionally high growth rates for fixed capital formation during the mid-1960s. Their investment in machinery and transport

equipment also evidenced high growth. In the Libyan Arab Republic this reflected the heavy investment made in oil extraction, and in Zambia, it reflected the expansion of the copper mines.

33. Turning from growth rates of investment to the level as a fraction of GDP, the Latin American countries tended to invest the highest proportion of GDP in machinery and transport equipment; the averages for this category in the later period of the 1960s were 9.5 per cent in Latin America, 4.4 per cent in Asia and 3.1 per cent in Africa. Fifteen of the 18 Latin American countries with available data invested more than 7 per cent of GDP in machinery and transport equipment, while only 3 of 16 Asian countries and [illegible] African countries invested above this level. This contrast reflects the greater pre-existing industrialization in Latin American (and also greater mechanization in agriculture). A hopeful sign for the future is that many of the [illegible] in Africa were increasing the proportion of GDP devoted to investment.

34. The hypothesis is evaluated that countries having the greatest increase in the proportion of total investment allocated to manufacturing will show the greatest increase in the level of industrialization, defined as the share of manufacturing output in GDP. Except for Africa, the data show evidence of a significant positive relationship between these two variables. The conclusion is that decisive encouragement of industrialization requires more than a shift of investment to this sector. In some countries manufacturing has grown faster than the rest of the economy at a time when it has received a constant or declining share of investment. In such cases there may have been spare capacity remaining from investments undertaken earlier, and the growth of output may result from favourable changes in other factors, such as demand, the availability of skilled persons to operate equipment, or the availability of other necessary inputs. Investments in infrastructure also may facilitate manufacturing. By contrast, in some countries the concentration of investment in manufacturing succeeded only in creating spare capacity, because other conditions were not favourable. This conclusion tallies with that arrived at on other grounds in paragraph 9 above.

35. The net flow of resources reaching developing countries from abroad (after deducting outflows of capital, interest and profits) increased at a compound

rate of 6 per cent per annum from 1960 to 1965. The most significant increase occurred in flows through multilateral agencies, which rose during the First Development Decade to more than three times their initial level. On the other hand, net private capital flows expanded more rapidly than [illegible] net official grants and loans, rising at a rate of 8.7 per cent annually and growing from 34 to 46 per cent of the over-all net flow from countries of the Development Assistance Committee (DAC). The DAC countries were responsible for about 95 per cent of all external resources reaching the developing countries. On the other hand, even most of the DAC countries were far from fulfilling the goal of devoting 1 per cent of GDP to the development of the poorer countries.

36. The inflow of private foreign capital was very unevenly distributed. One country in Latin America (Mexico) received 30 per cent of the combined receipts of 23 countries in the region. Between 1965 and 1967, Brazil, Mexico and Venezuela together received well over one half of the total private foreign capital flowing into Latin America. Nigeria alone received over one half of that invested in 15 African countries for which data were available. In Asia, the Republic of Korea was the most important recipient.

37. It may give a more accurate picture to consider per capita receipts of foreign private investment. These also were very uneven. In Latin America, the highest per capita receipts went to small countries, namely Surinam, Costa Rica, Jamaica, Nicaragua and Trinidad and Tobago. In fact, these countries had greater per capita receipts than the highest figures in the other two regions. To illustrate the unequal distribution, 8 Latin American countries with receipts of more than $20 per capita took in 62 per cent of the total inflow of private capital, although they had only 15 per cent of the population. The over-all per capita figure for the Asian region was only 15 per cent of the comparable figure for Latin America, and the flows to Asia were even more unequally distributed among countries. The distribution of foreign private investment in Asia, however, may have been offset by a compensating apportionment of foreign official capital. In Africa, the main recipient countries were Tunisia, Ghana and Sierra Leone. Four African countries with the highest receipts took in 45 per cent of the foreign private capital invested in Africa but accounted for only 10 per cent of the population.

38. The proportion of this flow of private capital invested in manufacturing is not available. Some of the largest concentrations were devoted to the

development of natural resources. However, manufacturing seemed to be taking an increasing share. This is clear for foreign private investments of the United States of America, which amounted in 1967 to over half of total foreign private investments in the developing countries. By that time, about 40 per cent of the flow from the United States was going into manufacturing.

V. INDUSTRY AND AGRICULTURE IN ECONOMIC DEVELOPMENT

40. As in the past, one chapter of the Industrial Development Survey has to deal with a topic of special importance for industrialization in the developing countries. This chapter in volume IV concerns the relationship between industry and agriculture and was prepared in consultation with FAO.

41. A comparison of the structural transformation now taking place in the developing countries with the historical record for the industrialized countries indicates that the transformation in output towards a higher share for industry and a declining one for agriculture is being repeated, but the relative decline of the agricultural labour force in today's developing countries lags well behind the shifts in output. Furthermore, the limited decline that has occurred in agriculture's share of the labour force has not been matched by a corresponding rise in industry's share. Instead, migrants from agriculture have tended to find casual employment in the services sector, while employment in industry has been limited by the factors discussed above in paragraphs 23-24.

42. The macro-economic relationship between industry and agriculture, which underlies the structural transformation, includes intersectoral capital and labour transfers. Barring sizable inflows of foreign investment in manufacturing, the agricultural sector must finance the early stages of industrialization either through direct participation, taxation or adverse changes in its terms of trade. As the size of the industrial sector grows, it ceases to be so dependent on outside finance. The large-scale movement of labour from agriculture to industry, which often has been considered essential, is no longer so critical as in the past century, as indicated in the paragraph above.

43. The importance of these intersectoral relationships may be illustrated by considering how strategies to develop agriculture have distinct ramifications

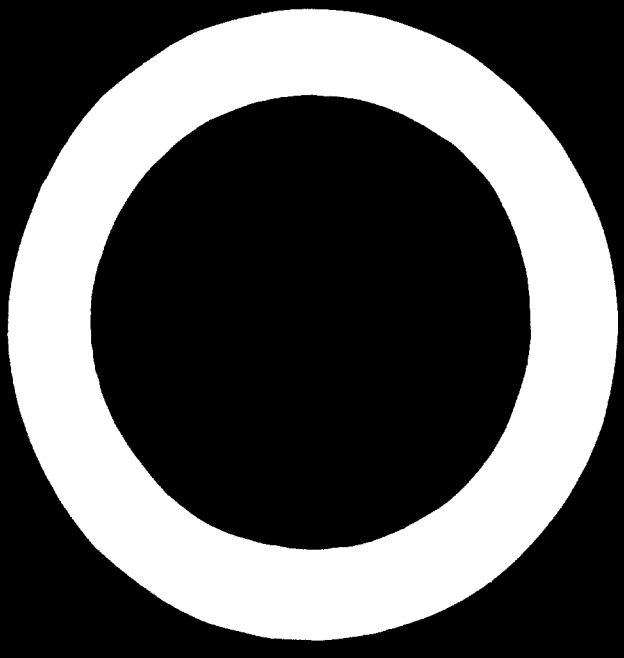
for the industrial sector and vice versa. For instance, a programme to stimulate agricultural output calls for increased manufactured inputs such as fertilizers, pesticides, fungicides, tools, water-management facilities etc. Some of these may be made domestically and some may be imported. To the extent that they are imported, the availability of foreign exchange for industrial equipment, raw materials and intermediate products is reduced. If the programme to stimulate agriculture is so ambitious that foreign exchange reserves become insufficient, its own implementation will require new domestic manufacturing to produce import substitutes, although not necessarily the agricultural inputs themselves.

43. An agricultural strategy based, for instance, on land reform or the settlement of new areas with "family farms" may mean: (1) a change in requirements for farming equipment from larger machinery to simpler tools; (2) a demand for equipment to clear land and build roads and for components of new dwellings, farm buildings and irrigation and drainage facilities; (3) an enlarged market for low-priced consumer manufactures; (4) a reduction in rural-urban migration. Comparably far-reaching influences radiate from any specific strategy to promote industry, such as an import-substitution strategy.

44. The technical interdependence between agriculture and industry, viewed in terms of their respective inputs, is obvious. The manufacturing sector uses agricultural output in the making of flour, vegetable oils and sugar; the canning, freezing and drying of foods etc. At a higher level, agricultural products are converted into bakery goods, pasta, beer etc. Several manufacturing branches also process non-food agricultural products, such as textile fibres, hides and skins, wood products and tobacco. In its turn, agriculture utilizes manufactured goods as key inputs. The roles of industry both in expanding crop area and in enhancing crop yields are analysed in detail, and extensive comments are made on the establishment in developing countries of key industries supporting agriculture, particularly fertilizers, pesticides and farm equipment. Agriculture's reliance on industrial inputs increases as agriculture becomes more modern; on the other hand, industrial processing of agricultural output typically increases in importance during the early stages of industrialization, but its relative role in industry declines later on.

45. There is mounting evidence that within the near future the widespread efforts at national self-sufficiency in cereal grains will considerably dampen export potential for wheat, rice, maize and other cereals. Countries desirous of expanding the export earnings of their agricultural sectors may, therefore, turn increasingly to the export market for processed foods. These markets presently are concentrated in the high-income countries, and the developing countries, to compete, must match the standards of quality and hygiene set by industries there. Moreover, they must compete with low unit costs achieved through large, highly mechanized production units.

46. The ability to compete in world markets also requires integrated production units. For agro-industries, vertical integration brings the production of the agricultural commodities and their processing and marketing under one management. Horizontal integration links support industries and by-product utilization to the basic agro-industrial complex. For example, if livestock production, meat-processing and marketing form the basic complex, the production of feedstuffs and the tanning and processing of leather might be linked to it. These forms of integration, by providing centralized management and enhanced profitability, may allow a developing country to introduce products into international markets years ahead of what would be possible if agro-industries develop in an unplanned fashion.



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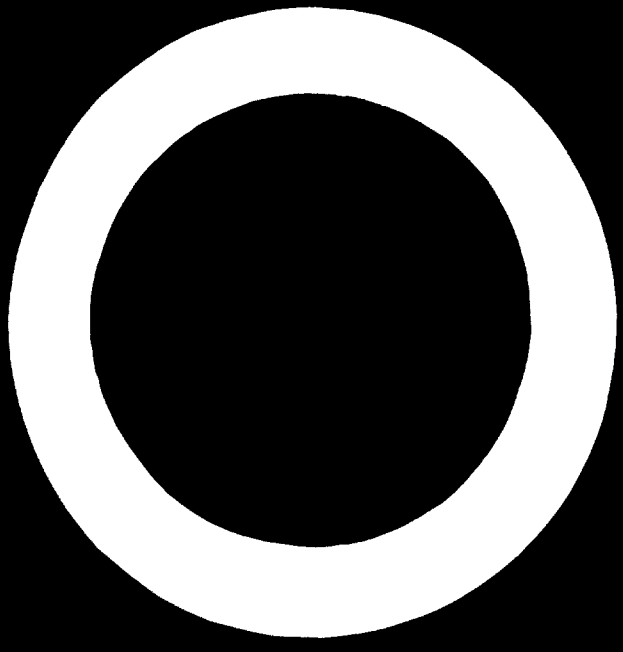

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Foreword

This is the fourth in a series of industrial development surveys, prepared in response to Economic and Social Council Resolution 1030 (XXXVII) requesting the Secretary-General to arrange for the preparation of periodic industrial development surveys, and in response to General Assembly Resolution 2152 (XXI) and Resolution 1 (I) adopted by the Industrial Development Board at its first session.

Chapter I reviews the recent progress of manufacturing, particularly in developing countries, in terms of output growth and its relation to target growth rates, population increases and growth of the non-manufacturing sectors of the economy. In general, manufactured output growth in both the developing countries and the developed market economies recovered in 1968 and 1969 from the sharp deceleration in 1967, but the momentum did not continue into 1970. In the centrally planned economies manufactured output continued to grow at high rates during this period. Over the longer run, the pace of industrial growth in developing countries has declined gradually over the past three five-year periods, although this naturally was not the case for each individual country. Estimates are made in this chapter of the relationship between industrial growth and various other economic factors such as growth of exports and agricultural output, the rate of school attendance at the secondary school level, and the growth of domestic capital formation. Certain aspects of the analysis are extended to the major branches of manufacturing.

Chapter II, which reviews trade in manufactured goods, shows that the share of manufactured exports from developing countries in world manufactured exports has expanded somewhat during the First United Nations Development Decade, while their share of non-manufactured exports has failed to keep pace. The developed market economies increased their relative position as a market for developing countries' manufactures. Trade among the developing countries themselves declined as a share of their total trade. Beyond assessing trade performance, this chapter comments on the current situation regarding the generalized scheme of preferences, the impact of regional integration on intra-regional trade, and the role of non-tariff distortions affecting the trade of developing countries.

A slackening of industrial development in the later 1960s had adverse implications for employment in developing countries, which is treated in chapter III. It appears that the expansion rate of manufacturing employment dropped off from an annual rate of 4.3 per cent per annum in the periods 1955—1960 and

1960–1965 to 2.1 per cent in the years 1965–1968. The review of recent progress is followed by a discussion of a number of interesting policy questions related to manufacturing employment in the Second Development Decade, such as those regarding factor prices and factor intensity, income distribution, the displacement of artisan workers, and the adoption of explicit employment goals in development planning.

Chapter IV marshals the available information on investment in manufacturing and its contribution to the expansion of output. The rate of growth of investment in manufacturing is estimated for a number of countries for which no direct observations exist. The levels of fixed capital formation in various countries are analysed, with attention focused especially on investments in machinery and equipment, and the relationship of these investments to manufacturing output growth is investigated. Finally, the flow of capital to developing countries from abroad is examined.

Chapter V concerns the relations between industry and agriculture in economic development. An historical review of the structural transformation in the currently industrialized countries is provided as a background for assessing recent performance in developing countries. The mutual support between industry and agriculture is emphasized. It is pointed out that the importance of industrial support to agriculture tends to grow as development proceeds, while agriculture-based industries normally decline as a proportion of total manufacturing. It is shown, moreover, that the absence of co-ordination in strategies and policies between those who plan for agriculture and those who plan for industry may lead to serious conflicts and contradictions. Finally, the growing importance of quality control, modern technology and vertical integration is emphasized for those industries that process agricultural products for markets in the developed countries.

CONTENTS

Chapter I

Chapter II

Chapter III

CONTENTS *(continued)*

Chapter IV

INVESTMENT AND INDUSTRIALIZATION

Chapter V

INDUSTRY AND AGRICULTURE IN ECONOMIC DEVELOPMENT

Annex

LIST OF TABLES

Chapter I

Chapter II

LIST OF TABLES *(continued)*

EXPLANATORY NOTES

Regional classifications, industrial classifications, trade classifications and symbols used in the statistical tables of this survey follow those adopted in the United Nations *Statistical Yearbook*. (For a detailed description of the terminology used in this volume, see footnotes (*a*) and (*b*) to table 1.)

Countries are generally arranged in the order adopted in the *Statistical Yearbook*. Inclusion of a particular country or territory in any economic or geographical grouping (or its exclusion) has been dictated by considerations of availability of comparable data in statistics of the United Nations and other international agencies.

References to ISIC codes in the tables are accompanied by a descriptive title (e.g. ISIC 24: "Clothing, footwear and made-up textiles"). Space considerations, however, may sometimes result in a shortening of this description (e.g. ISIC 24 may be referred to simply as "Clothing").

Dates divided by a slash (e.g. 1960/1961) indicate a crop year or a financial year.

Dates divided by a hyphen (e.g. 1960–1965) indicate the full period involved, including the beginning and end years.

Reference to tons indicates metric tons, and to dollars ($) United States dollars, unless otherwise specified.

The term "billion" signifies a thousand million.

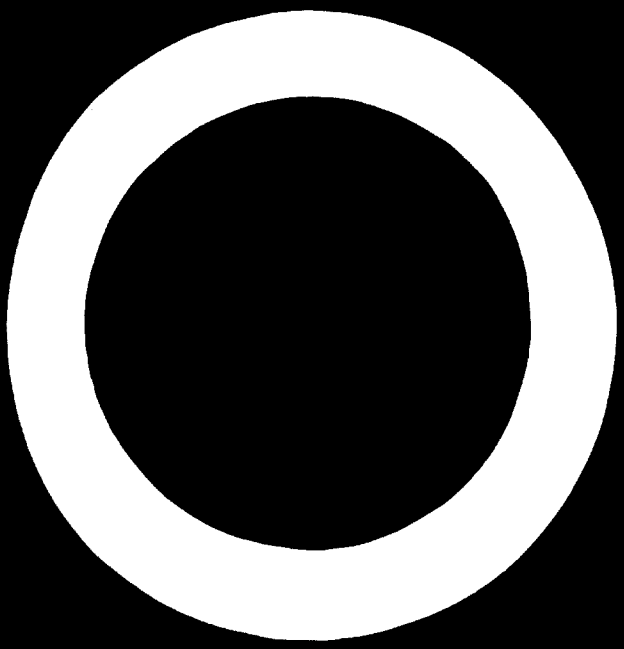
Annual rates of growth or change, unless otherwise specified, refer to percentage rates calculated on a compound basis.

In tables:

Details and percentages do not necessarily add to totals, because of rounding;
Three dots (...) indicate that data are not available or are not separately reported;
A dash (—) indicates that the amount is nil or negligible;
A blank indicates that the item is not applicable.

The following abbreviations are used in this volume:

BTN	Brussels Tariff Nomenclature
CACM	Central American Common Market
DAC	Development Assistance Committee of OECD
ECAFE	Economic Commission for Asia and the Far East
ECLA	Economic Commission for Latin America
EEC	European Economic Community
EFTA	European Free Trade Association
FAO	Food and Agriculture Organization of the United Nations
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
ILO	International Labour Organisation
ISIC	International Standard Industrial Classification
LAFTA	Latin American Free Trade Association
MVA	manufacturing value added
n.e.s.	not elsewhere specified
NTD	non-tariff distortion
OECD	Organisation for Economic Co-operation and Development
SITC	Standard International Trade Classification
UNCTAD	United Nations Conference on Trade and Development



Chapter I

RECENT TRENDS IN THE DEVELOPMENT OF MANUFACTURING

World growth of manufacturing

Manufacturing output in the developed market economies increased at a rate of 7.1 per cent in 1968 and 7.4 per cent in 1969, but declined to a rate of 2.1 per cent in 1970. The performance of the developing countries as a whole followed a similar pattern of growth over the same years. In Asia, the growth rate of manufacturing output increased to 6.9 per cent in 1968 and to the very high level of 9.3 per cent in 1969, but dropped to 5.9 per cent in 1970. Preliminary data suggest that Latin America followed a different pattern; its manufacturing growth rate increased to 6.8 per cent in 1968, fell to 5.1 per cent in 1969 and increased to 6.8 per cent in 1970. The annual data for the region of Africa were not available at the time this survey was compiled, but the performance of a number of African countries suggests that the growth of manufacturing output in the region remained at a steady rate of about 4 per cent in 1968, 1969 and 1970. In general, manufacturing output in both the developing countries and the developed market economies recovered in 1968 and 1969 from a sharp decline in the growth rate in 1967, achieving higher growth rates than the average for 1960—1965, but the momentum reached in these last two years of the First Development Decade did not continue into 1970. Over the same period, in the centrally planned economies manufacturing output continued to grow at higher rates than those for the developed market economies, without noticeable fluctuations except for 1969. The centrally planned economies registered growth rates of 9.3 per cent in 1968, 7.2 per cent in 1969 and 9.2 per cent in 1970.

It is usual to monitor progress by comparing growth rates with those of some past period or with growth targets. Both approaches are explored in the present analysis. The growth of manufacturing output for the period 1960—1969 is compared with that of 1955—1960, and target growth rates for the First Development Decade are used as bench-marks. In the First Development Decade the target for the growth of GDP was set at 5 per cent per annum, but no specific target was designated for manufacturing. It is therefore necessary to estimate what might have been an appropriate target. Various estimates given for the

growth elasticity of manufacturing with respect to GDP fall around 1.4 per cent.[1] On the basis of this figure for manufacturing growth elasticity, it may be calculated that the growth of the manufacturing sector should have increased at an annual rate of 7 per cent if the over-all growth target of 5 per cent were to be met. In the discussion that follows the growth of manufacturing output at the regional level is compared with this 7 per cent rate. At the country level, the growth of manufacturing is compared whenever possible with goals set by the individual countries.

A well-publicized goal of industrialization is the achievement of stability of income in an economy that suffers from fluctuations owing to heavy dependence on the primary sector. It is thought that industrialization accomplishes this goal by diversifying the economy and reducing the dependence on primary exports. It is therefore also appropriate to explore here the relationship between fluctuations in manufacturing output and fluctuations in GDP, if only in a preliminary fashion.

Finally, an attempt is made to analyse recent industrial growth. One approach to this analysis involves the use of a so-called "growth factor score" in an effort to infer some of the key factors influencing economic growth. A second approach entails investigating shifts in the relative importance of the various major industry groups and relating these shifts to the growth of both *per capita* income and population.

Growth of manufacturing output by regions

A comparison of manufacturing growth rates in table 1 shows that the centrally planned economies led the other economic groupings with an average annual growth rate of 8.6 per cent in the period 1960—1969. The developing countries as a whole recorded an average annual growth of 6.4 per cent, a rate slightly higher than the 6 per cent achieved by the developed market economies in this period. Among the developing regions, Asia had the highest growth rate at 7 per cent. Latin America and Africa recorded rates of 5.7 per cent and 3.9 per cent respectively. In view of the fact that less than 8 per cent of world manufacturing output is currently produced in the developing countries, these countries will not be able to catch up with the developed market economies if they maintain only this slight difference in their over-all rate of growth. The similarity in these growth rates also indicates that the distribution of manufacturing output between the developing countries and the rest of the world has changed little in the last 10 years. The present gap between the growth rate of the developing countries and that of the centrally planned economies is likely to become even greater, owing to the considerably higher rate of growth in manufacturing output in the latter countries.

It should be noted that for the developing countries the average annual

[1] For example, United Nations, *A Study of Industrial Growth* (Sales No.: 63.II.B.2); United Nations, *The Growth of World Industry, 1938—1961*, No. 3 — *International Analyses and Tables* (Sales No.: 64.XVII.8).

TABLE 1. GROWTH OF MANUFACTURING OUTPUT,[a] BY REGION AND ECONOMIC GROUPING,[b] 1960—1971

Average annual rate based on output index numbers
(Per cent)

	Developing countries				*Developed market economies*	*World, excluding centrally planned economies*	*Centrally planned economies*	*World*
	Total	*Africa*[c]	*Asia*	*Latin America*				
1966	5.1	2.1	4.2	5.1	7.8	6.9	8.5	7.8
1967	4.0	0.8	4.8	4.1	1.6	2.4	10.2	4.0
1968	7.0	3.9	6.9	7.8	7.1	6.3	9.3	7.7
1969	7.2	...	9.3	5.1	7.4	7.4	7.2	7.9
1970	6.0	...	5.9	6.8	2.1	2.1	9.2	4.7
1971[d]	1.2	...	10.4	...	0.3	1.1	8.0	3.2
1955—1960	7.2	9.1	8.2	6.2	4.2	4.5	10.7	6.3
1960—1965	6.8	4.9	7.7	5.9	6.0	6.2	8.4	6.7
1965—1969	5.8	2.0[e]	6.3	5.5	6.0	5.7	8.8	6.8
1960—1969	6.4	3.9[f]	7.0	5.7	6.0	6.0	8.6	6.7

Source: UNIDO, based on United Nations, *Monthly Bulletin of Statistics*, *The Growth of World Industry* and *Yearbook of National Accounts Statistics*.

[a] "Manufacturing" includes the industry groups listed in Division 3 of the United Nations *International Standard Industrial Classification of All Economic Activities* (ISIC) (ST/STAT/M. 4/Rev. 2/Add. 1), United Nations Publication Sales No.: 71.XVII.8. In chapter 1, tables 2—9, and chapter 3, table 34, however, ISIC, Rev. 1 has been used.

[b] The following classification of economic groupings is used throughout this volume, in conformity with the classification adopted by the United Nations Statistical Office: "Developing countries" includes the Caribbean area, Central and South America, Africa (other than South Africa), East and South-east Asia (other than Israel and Japan), and the Asian Middle East. "Developed market economies" includes North America (Canada and the United States), Europe (other than Eastern Europe), Australia, Israel, Japan, New Zealand, and South Africa. "Centrally planned economies" includes Albania, Bulgaria, Czechoslovakia, the German Democratic Republic, Hungary, Poland, Romania, and the Union of Soviet Socialist Republics (USSR). "World" excludes Mongolia, the Democratic People's Republic of Korea, the Democratic Republic of Viet-Nam and the People's Republic of China. It should be noted that when the phrase "developed countries" is used in the text, it includes (or may include) both market and centrally planned economies.

[c] The manufacturing output for Africa is taken from the national income data supplied by the United Nations Statistical Office. Other data in the table are from the industrial production data published in the United Nations *Monthly Bulletin of Statistics*. In a strictly technical sense, therefore, data for Africa are not consistent with the other data.

Separate regional production and employment data for Africa are not available from the United Nations Statistical Office. Several tables, therefore, do not show these data for Africa. Although totals for developing countries generally include figures for Africa, it does not follow that the precise figures for Africa can be derived by subtracting Asian and Latin American data from the totals for developing countries.

[d] Data for the first nine months of 1971 became available as this publication was going to print. The growth rate for the first nine months of 1970 has therefore been used for the purpose of comparison with the growth rate for the first nine months of 1971. All other growth rates have been computed from United Nations publications available in November 1970.

[e] 1965—1968.

[f] 1960—1968.

growth rate declined over three successive periods, from 7.2 per cent in 1955—1960 to 6.8 per cent in 1960—1965 to 5.8 per cent in 1965—1969. More or less the same pattern of growth is evident for each of the three developing regions, as shown in table 1. The average annual growth rate in the developed market economies, on the contrary, increased from 4.2 in 1955—1960 to 6 per cent over the decade 1960—1969. Relative to their own past performance and that of the other economic groupings, therefore, the record of the developing countries for the growth of manufacturing output was not encouraging over the First Development Decade.

In terms of its relation to the general welfare, the growth of manufacturing output should be measured as *per capita* growth. Table 2 gives the average annual

growth rate of *per capita* GDP and *per capita* manufacturing output for the period 1960–1968. The average annual growth rate of *per capita* manufacturing output for the period 1960–1968 was 7.4 per cent for the centrally planned economies, 5.2 per cent for the developed market economies and 3.6 per cent for the developing countries. Among the developing regions, Asia led Latin America and Africa. The rapid population growth in many of the developing countries is, of course, a primary factor accounting for the considerable difference in *per capita* manufacturing output between the developing countries and the other economic groupings. The implication of these differences in growth rates is obvious. Increases in *per capita* welfare are more difficult to achieve the higher the population growth rate. Largely because of the population growth rate the distance is also widening between the developing countries and the other economic groupings in the growth of *per capita* GDP.

The growth target for the First Development Decade, as noted earlier, was an average increase of GDP at 5 per cent per annum, which would require an average annual growth of about 7 per cent for the manufacturing sector. Asia was the only developing region to achieve this target growth rate for manufacturing; the rates for Latin America and Africa fell short of it. This fact together with the long-run decline in the growth rates of manufacturing output in the developing countries discourages hope for a faster growth rate in the near future. The target for the average annual growth rate of manufacturing output in the Second Development Decade is 8 per cent for the first half of the decade and an even higher rate for the second half.[2] It would appear that an enormous effort will be necessary to reverse the slowly declining trends in manufacturing growth for many of the developing countries to achieve these ambitious targets. Since the industrialization of the developing countries depends not only on internal factors but also on external factors such as the inflow of foreign capital, availability of suitable technology and accessibility to the markets of the developed countries, future manufacturing growth in the developing countries depends partly on the co-operation of the developed market economies and the centrally planned economies.

Because economic transformation usually entails a steady growth in the importance of the industrial sector, it is appropriate to determine the extent of the contribution of manufacturing to the growth of GDP. In table 3 the incremental growth of manufacturing output is measured against the incremental growth of GDP by the use of a contribution ratio. This ratio does not measure the multiplier effect of the manufacturing sector nor does it imply any qualitative effect of manufacturing on the whole economy. It is merely an attempt to apportion the growth of GDP among the major sectors of the economy. The contribution ratios indicate the percentages contributed by the various sectors to a given increment to GDP. The relative share of manufacturing output in GDP and its

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[2] United Nations, *Towards Accelerated Development: Proposals for the Second United Nations Development Decade* (Sales No.: 70.II.A.2), p. 10.

TABLE 2. GROWTH RATE OF PER CAPITA GDP AND PER CAPITA MANUFACTURING OUTPUT,[a] BY REGION AND ECONOMIC GROUPING, 1960—1968

Average annual change in index number

	Per capita GDP	*Per capita manufacturing*
Developing countries	2.1	3.6
Africa	1.7	1.4
Asia	1.9	4.3
Latin America	1.9	2.9
Developed market economies	4.2	5.2
Centrally planned economies[b]	5.6	7.4

Source: UNIDO, based on United Nations, *Yearbook of National Accounts Statistics* and other data supplied by the United Nations Statistical Office.

[a] Manufacturing here is defined by ISIC 2-3, Rev. 1.

[b] Gross material product is used in place of gross domestic product.

growth rate are the principal determinants of this ratio, along with the rate of growth of the non-manufacturing portion of GDP.[3]

In the developing countries the manufacturing sector contributed on the average 22.4 per cent of the increment to GDP per annum over the period 1960—1968. This is the highest contribution ratio of the various sectors to GDP. Although the contribution ratio of the agricultural sector is relatively high—18.4 per cent—the contribution ratio of agriculture is smaller than the sector's share—33.2 per cent—in GDP in 1963. This wide difference is explained by the fact that GDP grew at an annual average rate of 4.7 per cent as compared to 2.6 per cent for agriculture. Although the difference in the contribution ratios between agriculture and manufacturing is presently small, continuing differential growth rates will widen the gap.

The manufacturing sectors in Latin America and Asia registered contribution ratios of 28.1 per cent and 21.7 per cent respectively in 1960—1968, while Africa scored only 9 per cent. The manufacturing sector in the centrally planned economies surpassed that of the other economic groupings with a contribution ratio of 60 per cent. Because gross material product is used in the calculation for the centrally planned economies, the relative magnitude of the manufacturing sector's contribution should be given somewhat less weight if comparison is made with other economic groupings using gross domestic product as a basis for the calculations. Even given this allowance, however, there seems little doubt that the manufacturing sector contributes a larger share to the growth of national income in the centrally planned economies than it does in any other economic grouping.

[3] The contribution ratio is calculated on the assumption that the contribution of a sector to the growth of the whole economy is exactly equal to that sector's increase in output. This assumption does not take into account the income-multiplying effect of the manufacturing sector nor its effect on other sectors through input-output relationships. The ratio indicates the relative degree of change of a sector in an economy. Since it measures the relative changes of a sector, there could be a case in which a low growth of manufacturing output such as an annual growth rate of 1 or 2 per cent could result in a high relative contribution if other sectors are stagnant.

TABLE 3. CONTRIBUTION OF MAIN ECONOMIC SECTORS TO THE GROWTH OF GROSS DOMESTIC PRODUCT, BY REGION AND ECONOMIC GROUPING, 1960—1968[a]

(Per cent)

	GDP	*Agri-culture*	*Manu-facturing*	*Con-struction*	*Transport and com-munications*	*Wholesale and retail trade*
Developing countries						
Sectoral distribution, 1963	100.0	33.2	17.0	3.7	5.5	13.9
Average growth rate, 1960—1968	4.7	2.8	6.2	5.8	5.6	5.1
Sectoral contribution to GDP growth, 1960—1968	100.0	18.4	22.4	4.6	6.6	15.1
Latin America						
Sectorial distribution, 1963	100.0	21.1	23.3	3.3	6.4	16.3
Average growth rate, 1960—1968	4.9	3.2	5.9	5.5	4.6	5.0
Sectoral contribution to GDP growth, 1960—1968	100.0	13.8	28.1	3.7	6.0	16.6
Asia						
Sectoral distribution, 1963	100.0	43.6	14.6	3.9	4.9	12.4
Average growth rate, 1960—1968	4.7	2.6	7.0	6.1	6.0	5.5
Sectoral contribution to GDP growth, 1960—1968	100.0	24.1	21.7	5.1	6.3	14.5
Africa						
Sectoral distribution, 1963	100.0	40.4	9.7	4.7	5.2	14.3
Average growth rate, 1960—1968	4.2	2.4	3.9	5.1	5.9	4.0
Sectoral contribution to GDP growth, 1960—1968	100.0	23.1	9.0	5.7	7.3	13.6
Developed market economies						
Sectoral distribution, 1963	100.0	6.7	29.7	5.7	6.9	14.6
Average growth rate, 1960—1968	5.3	2.2	6.3	4.5	5.8	5.6
Sectoral contribution to GDP growth, 1960—1968	100.0	2.8	35.3	4.8	7.6	15.4

TABLE 3 *(continued)*

	GDP	*Agriculture*	*Manufacturing*	*Construction*	*Transport and communications*	*Wholesale and retail trade*
Centrally planned economies						
Sectoral distribution, 1963	100.0	19.7	46.3	8.3	9.0	7.4
Average growth rate, 1960—1968	6.8	2.5	8.8	6.0	8.2	5.4
Sectoral contribution to GDP growth, 1960—1968	100.0	7.2	60.0	7.3	0.9	6.2

Source: UNIDO, based on United Nations, *Yearbook of National Accounts Statistics* and other data supplied by the United Nations Statistical Office.

[a] The contribution ratio of a sector is calculated by the following equation: $\frac{G_i \times R_i}{\Sigma (G_i \times R_i)} \times 100$ where G_i is the growth rate of sector i and R_i is the relative share of the output of sector i in GDP in 1963.

GROWTH OF MANUFACTURING OUTPUT, BY INDIVIDUAL DEVELOPING COUNTRIES

An examination of the growth of manufacturing output by developing region indicates that industrialization has progressed rather slowly in the developing countries. Although the growth rate over a specific period does not necessarily point to the success or failure of industrialization, two disturbing facts emerge. First, the growth rate of manufacturing output in the developing countries declined during the First Development Decade, and the decline was characterized by a growth rate that was almost identical with that for manufacturing output in the developed market economies. At the country level, tables 4, 5 and 6 show growth rates of manufacturing output for selected developing countries over this decade. These rates give a different picture from that presented by the regional data. Twenty-four of the 50 countries achieved higher growth rates of manufacturing output than the average for all developing countries. When Argentina, Brazil and India, whose combined manufacturing output accounted for about 45 per cent of total manufacturing output of the developing countries in 1963, are singled out for examination, it is striking to note that these three countries registered considerably lower average annual growth rates during the First Development Decade than the average for the developing countries (6.4 per cent), namely, Argentina 4.7 per cent, Brazil 5.7 per cent and India 4.9 per cent. At the same time the manufacturing sectors in some of the countries that contributed significantly to the over-all manufacturing output of the developing countries exhibited above average growth during this decade. Examples are China (Taiwan) 17.1 per cent, the Republic of Korea 16.4 per cent, Pakistan 7.8 per cent, Mexico 8.3 per cent, and Peru 7.8 per cent. Many other countries, although their combined total manufacturing output is small, increased their individual outputs at faster rates than the average for their regions:

for example, in Asia, Ceylon 13.5 per cent, Iran 12.5 per cent, Jordan 10.5 per cent, Malaysia 10.8 per cent and Thailand 11.4 per cent; in Africa, Ethiopia 9.7 per cent, Ghana 8.2 per cent, the Libyan Arab Republic 10.6 per cent, the United Republic of Tanzania 11.7 per cent and Zambia 16.5 per cent; and in Latin America, Costa Rica 8.1 per cent, El Salvador 8.6 per cent, Honduras 9 per cent, Nicaragua 8.1 per cent and Panama 11.1 per cent.

In terms of the general welfare, the growth of *per capita* manufacturing output may be considered more important than that of total manufacturing output. Table 2 shows the growth of *per capita* manufacturing output as 3.6 per cent per annum for the developing countries, 5.2 per cent for the developed market economies and 7.4 per cent for the centrally planned economies over the period 1960—1968. Only 15 developing countries out of the 50 listed in tables 4, 5 and 6 registered faster growth rates of *per capita* manufacturing output than the average for the developed market economies. Some of the larger producers of manufactured products, such as Argentina, Brazil, India and Mexico, evidenced a slow growth of *per capita* manufacturing output. China (Taiwan) and the Republic of Korea were the only major producers of manufactures among the developing countries to record an increase in *per capita* manufacturing output at significantly higher rates, 13.6 and 11.3 per cent respectively, than the average for the developed market economies (5.2 per cent) and even for the centrally planned economies (7.4 per cent). Several other countries, Ceylon, Ethiopia, Panama, the United Republic of Tanzania and Zambia increased *per capita* manufacturing output at a substantially faster rate than the average for the developed market economies. The growth of *per capita* manufacturing output for the majority of the developing countries, however, was far behind that of the developed countries. Measured in terms of the slow growth and small value of *per capita* manufacturing output, industrialization in many developing countries fell far short of the aspiration of these countries.

The last column of tables 4, 5 and 6 gives the contribution ratio of manufacturing output to GDP. As in table 3, this ratio indicates the average percentage contribution of manufacturing output to the increment in GDP over the period in question. In general, African countries recorded lower contribution ratios than the other two regions, partly owing to the slow growth of manufacturing output and its relatively small share in GDP. There are exceptions. For example, manufacturing output increased at an average annual rate of 9.7 per cent in Ethiopia, a rate that exceeded the growth rate of GDP by 5 percentage points. The contribution ratio, however, was only 13 per cent because the relative share of manufacturing output in GDP was only 6.5 per cent. In the Libyan Arab Republic, manufacturing output increased at an average annual rate of 10.6 per cent, but the contribution ratio was only 2 per cent since GDP grew at a rate of 25.8 per cent over the same period, and the relative share of manufacturing output in GDP was only 4.4 per cent in 1963.

In Asia, all but four countries registered a higher contribution ratio for manufacturing than the percentage share of this sector in GDP in 1963, as shown in table 5. For example, the contribution ratio of Burma was 10 per cent and its manufacturing output accounted for 9.8 per cent of GDP in 1963. In Ceylon,

TABLE 4. GROWTH OF GDP AND MANUFACTURING OUTPUT AND CONTRIBUTION OF MANUFACTURING TO GDP GROWTH, BY SELECTED AFRICAN COUNTRIES, 1960—1968

	Growth of GDP	*Growth of per capita GDP*	*Share of manufacturing in GDP, 1963*	*Growth of manufacturing*	*Growth of per capita manufacturing*	*Contribution of manufacturing to GDP, 1960—1968*
	(average annual rate)		*(per cent)*	*(average annual rate)*		*(per cent)*
Algeria	—0.9	—3.2	12.6	—3.0	—5.3	—42
Egypt	5.2	2.6	18.8	4.3	1.8	16
Ethiopia	4.7	2.7	6.5	9.7	7.7	13
Ghana	2.7	0.0	5.2	8.2	5.4	16
Kenya	5.6	2.6	9.5	6.3	3.3	11
Libyan Arab Rep.	25.8	21.4	4.4	10.6	6.8	2
Malawi	3.8	1.2	5.3	3.6	1.0	5
Morocco	3.8	1.0	12.5	3.6	0.8	12
Nigeria	3.5	1.1	5.6	5.6	3.1	9
Southern Rhodesia	3.5	0.3	17.2	3.1	—0.1	15
Sudan	4.4	1.5	5.1	7.3	4.3	9
Tanzania, United Rep. of	4.1	1.6	3.4	11.7	9.0	10
Tunisia	3.7	1.4	13.0	6.0	3.6	21
Uganda	4.4	1.8	7.0	7.2	4.5	12
Zaire	0.1	—2.0	18.1	—1.5	—3.5	—272
Zambia	8.3	5.1	5.8	16.5	13.1	12

Source: UNIDO, based on United Nations, *Yearbook of National Accounts Statistics* and other data supplied by the United Nations Statistical Office.

TABLE 5. GROWTH OF GDP AND MANUFACTURING OUTPUT AND CONTRIBUTION OF MANUFACTURING TO GDP GROWTH, BY SELECTED ASIAN COUNTRIES, 1960—1969

	Growth of GDP	*Growth of per capita GDP*	*Share of manufacturing in GDP, 1963*	*Growth of manufacturing*	*Growth of per capita manufacturing*	*Contribution of manufacturing to GDP, 1960—1969*
	(average annual rate)		*(per cent)*	*(average annual rate)*		*(per cent)*
Burma*	3.6	1.4	9.8	3.8	1.6	10
Ceylon	4.3	1.8	8.6	13.5	10.7	27
China (Taiwan)	10.0	6.7	20.1	17.1	13.6	34
Cyprus*	6.5	5.4	11.1	5.2	4.2	9
India	3.1	0.6	15.3	4.9	2.1	24
Indonesia*	2.7	0.3	10.8	1.0	—1.4	4
Iran	8.0	4.9	21.3	12.5	9.3	33
Iraq*	6.3	3.3	7.6	4.4	1.5	5
Jordan*	5.8	2.8	9.0	10.5	7.4	16
Khmer Rep.*	4.3	2.0	8.8	5.7	3.3	12
Korea, Rep. of	8.5	5.5	13.6	16.4	11.3	26
Malaysia	5.9	2.8	9.1	10.8	7.6	17
Pakistan	5.5	3.3	10.9	7.8	5.6	16
Philippines	5.1	1.6	19.8	4.5	1.1	18
Syrian Arab Rep.*	6.3	3.3	8.0	6.3	3.3	8
Thailand*	7.6	4.4	11.4	11.4	8.1	17

Sources: UNIDO, based on ECAFE, *Economic Survey of Asia and the Far East*, 1970 (Sales No: 71.II.F.1); United Nations, *Yearbook of National Accounts Statistics;* and other data supplied by the United Nations Statistical Office.

* 1960—1968.

TABLE 6. GROWTH OF GDP AND MANUFACTURING OUTPUT AND CONTRIBUTION OF MANUFACTURING TO GDP GROWTH, BY SELECTED LATIN AMERICAN COUNTRIES, 1960—1970

	Growth of GDP	*Growth of per capita GDP*	*Share of manufacturing in GDP, 1963*	*Growth of manufacturing*	*Growth of per capita manufacturing*	*Contribution of manufacturing to GDP growth, 1960–1970*
	(average annual rate)		*(per cent)*	*(average annual rate)*		*(per cent)*
Argentina	3.6	2.0	31.1	4.7	3.0	45
Bolivia	5.4	3.0	14.9	7.2	4.9	18
Brazil	5.8	2.9	22.9	5.7	2.8	23
Chile	4.3	1.8	26.0	5.8	3.2	35
Colombia	5.1	1.6	19.3	6.2	2.7	24
Costa Rica	7.1	3.1	16.3	8.1	4.0	22
Dominican Rep.	3.7	0.4	16.9	3.5	0.2	16
Ecuador	5.0	1.5	15.9	6.5	3.0	21
El Salvador	5.5	2.2	14.6	8.6	5.2	23
Guatemala	5.2	2.2	13.1	7.6	4.6	19
Honduras	5.2	1.7	12.7	9.0	5.4	22
Mexico	6.9	3.3	27.3	8.3	4.6	33
Nicaragua	6.1	3.0	13.4	8.1	5.0	18
Panama	8.1	4.8	15.3	11.1	7.7	20
Paraguay	4.6	1.2	15.5	4.7	1.3	16
Peru	5.5	2.3	16.5	7.8	4.6	23
Uruguay	1.1	—0.2	21.3	1.7	0.4	33
Venezuela	4.6	1.2	12.2	6.6	3.1	18

Sources: UNIDO, based on ECLA, *Economic Survey of Latin America;* United Nations, *Yearbook of National Accounts Statistics;* and other data supplied by the United Nations Statistical Office.

China (Taiwan), Iran and the Republic of Korea, the contribution ratios for manufacturing exceeded 25 per cent, mainly owing to high growth rates in this sector. India recorded a high contribution ratio of 24 per cent in spite of a low manufacturing growth rate of 4.9 per cent. Thus, it is evident that in Asia the manufacturing sector is generally performing better in terms of generating growth of income than the other sectors, with the exception of a few countries.

Most of the Latin American countries listed in table 6 achieved contribution ratios greater than 20 per cent. In fact, in all except one country, the Dominican Republic, the contribution ratio was higher than the relative share of manufacturing in GDP. While the growth rate of the Latin American manufacturing sector was not impressive, the poor performance of other sectors of the economy enhanced the relative importance of manufacturing in generating income growth. Manufacturing in Argentina and Brazil was singled out earlier for its poor performance, but in both countries the manufacturing sector was nonetheless ahead of other sectors.[4]

[4] Thus, it is apparent that the contribution ratio is not an unequivocal measure. If, for example, the Mexican and Uruguayan performances are compared (table 6), it is seen that each has a contribution ratio of 33, whereas manufacturing output grew at only 1.7 per cent per annum in Uruguay and at 8.3 per cent in Mexico. Healthy growth of agriculture in Mexico, however, resulted in a rapid growth rate for the non-manufacturing portion of GDP. Growth of the non-manufacturing sectors thus has a depressing tendency on the contribution ratio of manufacturing.

Realized versus target growth rates

Another way to measure industrial growth is to compare the growth of manufacturing output with the planned or target growth for that sector for the various developing countries. Table 7 shows the planned growth rates for GDP and for manufacturing output for a number of developing countries. Because the periods covered for planned growth are not identical with the periods shown in tables 4, 5 and 6, the comparison gives only a rough indication of performance. Among the countries listed in table 7, China (Taiwan) and the Republic of Korea were the only ones to exceed their planned rates of growth for manufacturing output and GPD. The rest were unable to reach planned targets for either GDP or manufacturing output, with the exception of Argentina, Ceylon and Jordan where growth rates fell short of the target for GDP but exceeded the planned rates for growth of manufacturing output.

If the standards of the First Development Decade (5 per cent rate of growth for GDP and 7 per cent for manufacturing output) are applied, somewhat more than half of the developing countries listed in tables 4, 5 and 6 achieved the target for growth of GDP and about one half reached that for the growth of manufacturing output. In terms of this standard, the performance of the manufacturing sector varied among the developing countries.

Another criterion for evaluating the performance of the manufacturing sector is its contribution to the stability of economic growth. It is sometimes argued that industrialization tends to reduce the degree of economic fluctuation in the developing countries by diversifying the economic base. The annual growth rate of GDP and that of manufacturing output are shown in table 8 for selected developing countries for which data are available. In the ensuing discussion reference is made to fluctuations in the growth rate and not to levels of output, because the value either of GDP or of manufacturing output measured in constant national prices did increase in every year for most developing countries with only a few exceptions.

The case of Argentina is of particular interest. When its annual growth rates for manufacturing output and GDP are compared, the fluctuation of the former is seen to be greater than that of GDP. The relative share of manufacturing output in GDP was 31 per cent in 1963, from which it might be assumed that the rate of growth of manufacturing output would have a significant effect on the growth rate of GDP. The data in table 8, however, show that the fluctuations of the manufacturing sector did not significantly influence the growth of GDP in a similar direction. The obvious explanation for this phenomenon is that the other sectors of the economy acted as stabilizers. More or less the same situation, with the exception of a few years, is observed for Brazil. In Mexico, however, the fluctuations of annual growth rates for manufacturing were less than for Argentina or Brazil, with only two distinct deviations. Also, fluctuations in the manufacturing growth rate did not differ to any significant degree from fluctuations in the growth of GDP. From these observations it appears that in Mexico the manufacturing sector may have contributed to the stability of the

TABLE 7. PLANNED AND ACTUAL ANNUAL GROWTH OF GDP AND MANUFACTURING OUTPUT FOR SELECTED DEVELOPING COUNTRIES

Average annual rate

(Per cent)

	Planned growth			Actual growth		
	Period	GDP	Manufacturing output	Period	GDP	Manufacturing output
Africa						
Tanzania, United Rep. of	1960—1970	6.7	14.9	1960—1968	4.1	11.7
Tunisia	1957—1971	5.3	8.0	1960—1968	3.7	6.0
Uganda	1966—1971	6.3	10.1	1960—1968	4.4	7.2
Asia						
Ceylon	1951—1968	6.0	11.7	1960—1969	4.3	13.5
China (Taiwan)	1964—1968	7.1	11.4	1960—1969	10.0	17.1
India	1967—1974	5.3	8.5	1960—1969	3.1	4.9
Iraq	1964—1969	8.5	11.3	1960—1968	6.3	4.4
Jordan	1963—1970	7.2	7.0	1960—1968	5.8	10.5
Korea, Rep. of	1965—1971	6.8	10.8	1960—1969	8.5	16.4
Pakistan	1965—1970	6.5	10.1	1960—1969	5.5	7.8
Philippines	1960—1967	6.0	10.0	1960—1969	5.1	4.5
Latin America						
Argentina	1960—1967	4.0	4.3	1960—1970	3.6	4.7
Bolivia	1958—1971	8.9	7.7	1960—1970	5.4	7.2
Chile	1961—1970	5.5	6.3	1960—1970	4.3	5.8
Ecuador	1965—1969	6.5	10.3	1960—1970	5.0	6.5
Honduras	1965—1974	7.0	13.0	1960—1970	5.2	9.0
Paraguay	1966—1970	6.0	8.8	1960—1970	4.6	4.7
Venezuela	1964—1968	7.1	10.8	1960—1970	4.6	6.6

Source: UNIDO, *Summaries of the Industrial Development Plans of Thirty Countries*, Vol. I (UNIDO/IPPD. 11), Vienna, 1970.

growth of income. India and Pakistan are also countries with major manufacturing sectors. Except for 1965, when both countries experienced a decline in manufacturing output (less sharp in Pakistan), the year-to-year fluctuations were greater for GDP than for manufacturing output, as seen from table 8. In both countries the fluctuations of the two variables moved in the same direction. Thus, the manufacturing sector seems to have played a stabilizing role in the growth of the national income in these countries.

The low regional average growth rates for manufacturing (see table 1) are partly owing to the relatively poorer performance of a few developing countries with large manufacturing sectors. This means, however, that the growth rates for a large number of developing countries whose manufacturing sectors are proportionately small have increased faster than the average annual rate of 6.4 per cent. It is therefore not misleading to state that the majority of developing countries registered rates of growth for manufacturing output that exceeded the average for their respective regions.

China (Taiwan) and the Republic of Korea enjoyed rapid growth rates of manufacturing output in the First Development Decade. Although they

maintained high growth rates for both GDP and manufacturing output, fluctuations in manufacturing growth rates were rather large. For example, in China (Taiwan) the growth rate of manufacturing output declined from 14.1 per cent in 1962 to 9.7 per cent in 1963 and jumped to 30.6 per cent in 1964. Fluctuations were not of such magnitude in the Republic of Korea, although in both countries changes in the rate of growth of manufacturing were greater than those for GDP. In China (Taiwan), the direction of the fluctuation in GDP and in manufacturing output coincided from year to year with two exceptions. The manufacturing sector appears therefore to insert a measure of instability into the growth of GDP in this country, although there is no doubt that manufacturing has constantly been a major factor in generating income. The situation in the Republic of Korea is not as clear as that in China (Taiwan). In the Republic of Korea the fluctuations in GDP and manufacturing output over this period often moved in opposite directions. It therefore seems that manufacturing output frequently compensates for the decline in growth rates of other sectors of the economy, thus functioning as a stabilizer.

The other countries listed in table 8 are smaller manufacturing producers, but they recorded a much faster growth in that sector than in GDP. With the exception of Ethiopia and possibly Peru, in the rest of these countries the fluctuation in the growth rate of GDP was greater than that of manufacturing output; the direction of the fluctuation for both variables was the same in almost all cases. It may be argued then that the manufacturing sector has functioned as an income stabilizer in many developing countries, as would commonly be expected. It must be recognized, however, that in the many cases where the share of manufacturing in GDP is small, the extent of its contribution to the stability of economic growth may not be great.

THE GROWTH FACTOR SCORE OF MANUFACTURING

In this section an attempt is made to pinpoint some of the factors that seem to affect industrialization at the aggregate level. In this analysis, it is recognized that the manufacturing sector is composed of many heterogeneous activities and each activity may respond differently to given economic conditions. It might be argued, therefore, that thorough planning for the development of the manufacturing sector should be carried out on the basis of extensive research into each manufacturing activity rather than on the basis of aggregate tendencies.

The growth rate of manufacturing output in a number of countries in the period 1960–1968 is related here, by the use of a growth factor score,[5] to:

[5] The growth factor score is calculated in the following way. First, the dependent variable and each independent variable are related separately by the correlation coefficient. Second, the highest value and the lowest value within each variable (dependent as well as independent) are given scores of 100 and 0 respectively, and scores for other values are calculated by $\frac{I-L}{H-L} \times 100$ where I is the individual value, H the highest value and L the lowest value. Third, scores of each variable are weighted by the respective values of the correlation coefficients. And fourth, weighted scores of all independent variables are added to make the aggregate score. This score is then related to the score of the dependent variable by the correlation coefficient.

TABLE 8. ANNUAL FLUCTUATIONS IN GROWTH RATE OF MANUFACTURING OUTPUT AND GDP IN SELECTED DEVELOPING COUNTRIES, 1961—1970

Annual growth rate based on index numbers

(Per cent)

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970[a]
Africa										
Ethiopia										
Manufacturing	10.9	7.0	5.3	16.9	10.2	9.7	6.2	11.7	...	...
GDP	4.8	4.5	3.0	4.8	6.9	4.1	4.5	4.5	...	...
Libyan Arab Rep.										
Manufacturing	26.0	8.7	5.0	9.5	7.0	13.0	13.7	13.3	...	...
GDP	28.3	7.6	43.5	43.5	26.5	16.5	12.2	24.9	...	...
Tanzania, United Rep. of										
Manufacturing	24.1	8.2	8.3	7.0	10.1	14.6	8.5	30.9	...	...
GDP	—4.2	7.1	3.6	6.7	1.8	8.8	1.9	2.1	...	...
Zambia										
Manufacturing	8.0	—1.1	7.5	17.0	29.9	16.4	47.5	0.4	...	...
GDP	0.0	—1.0	2.0	13.0	17.7	12.0	6.0	10.1	...	...
Asia										
China (Taiwan)										
Manufacturing	10.5	14.1	9.7	30.6	15.2	12.9	18.4	23.3	18.4	...
GDP	7.9	7.3	9.6	13.3	12.5	8.1	9.0	12.0	7.6	...
India										
Manufacturing	9.1	7.4	8.7	7.6	0.4	0.8	1.2	5.4	6.6	...
GDP	3.8	2.1	5.8	7.3	—5.5	0.9	8.9	1.9	5.5	...
Iran										
Manufacturing	8.2	14.6	17.8	6.2	15.0	11.2	12.9	11.9	13.2	...
GDP	5.6	6.6	5.0	5.2	12.8	6.9	12.4	7.6	10.2	...

Korea, Rep. of										
Manufacturing	2.7	15.0	17.2	4.1	22.3	16.0	23.9	28.1	15.9	...
GDP	4.8	2.8	9.2	8.8	7.0	12.7	7.5	13.0	21.8	...
Pakistan										
Manufacturing	11.3	9.4	9.5	8.3	5.1	8.0	6.2	6.0	7.7	...
GDP	5.9	3.7	8.4	4.2	4.7	5.0	7.5	5.2	5.8	...
Thailand										
Manufacturing	2.8	5.2	15.9	13.5	17.3	8.7	11.5	8.6	...	...
GDP	4.2	5.4	9.8	6.1	8.8	11.1	4.6	8.8	9.6	...
Latin America										
Argentina										
Manufacturing	9.7	—4.5	—4.6	15.1	12.7	—0.4	0.0	7.9	7.3	6.0
GDP	7.0	—1.8	—3.6	8.2	8.5	0.3	2.0	4.8	6.6	4.8
Brazil										
Manufacturing	10.6	7.8	0.2	5.2	—4.1	11.7	3.0	4.1	10.8	10.2
GDP	10.3	5.2	1.6	2.9	2.7	5.1	4.8	6.4	8.5	9.0
Honduras										
Manufacturing	14.2	3.7	4.5	17.2	9.6	10.5	10.2	9.0	6.5	5.2
GDP	4.4	7.7	1.1	5.0	9.4	6.8	5.8	4.9	3.2	4.0
Mexico										
Manufacturing	4.5	5.8	8.8	13.6	6.8	10.2	8.5	8.9	7.8	8.5
GDP	3.5	5.0	6.3	10.2	5.3	7.7	6.5	6.7	7.3	7.4
Panama										
Manufacturing	16.4	21.1	14.1	4.7	7.5	10.2	12.5	10.3	7.0	8.7
GDP	10.8	8.4	9.4	4.3	8.8	7.4	8.4	7.3	7.2	8.6
Peru										
Manufacturing	10.4	10.3	7.0	9.4	7.9	9.8	6.1	4.7	1.9	10.5
GDP	8.1	9.2	3.8	6.9	4.8	5.8	4.6	1.6	1.3	7.3

Source: UNIDO, based on United Nations, *Yearbook of National Accounts Statistics*; ECAFE, *Economic Survey of Asia and the Far East, 1970*; ECLA, *Economic Survey of Latin America*; and other data supplied by the United Nations Statistical Office.

* Provisional.

(1) the growth rate of GDP, (2) the growth rate of *per capita* GDP, (3) the level of *per capita* GDP in 1963, (4) the growth rate of agricultural output (1960–1968), (5) the growth rate of total exports (1960–1968), (6) as a substitute for skilled labour, the percentage of the enrolment of the secondary schools in the relevant age group in 1965, and (7) the growth rate of gross domestic capital formation (1960–1968). The growth rate of GDP is taken as an indicator of changes in the economic base of a country. The level of *per capita* GDP in 1963 and the growth rate of *per capita* GDP are assumed to represent respectively the level and changes in the level of income. The growth rate of agricultural output is also chosen as an explanatory variable because the leading manufacturing activities in many of the developing countries consist of the processing of agricultural products.

It is argued increasingly in some circles that the export of manufactures is vitally important to the economic development process. Export statistics may be separated into manufactures and non-manufactures, but the exports of manufactured products falling into the SITC groups 5–8 have not reached a significant level in developing countries. It therefore seemed advisable to use data for total exports for the present purposes. The availability of skilled labour is also thought to be one of the key determinants of industrialization. Since specific information regarding skills is not usually available for developing countries, the proportion of the relevant age group enrolled at the secondary school level is substituted for skilled labour. Finally, domestic capital formation of the manufacturing sector should have been used in this exercise, but again the scarcity of information would have severely limited the number of countries that could be considered. Gross domestic capital formation is therefore used as a proxy. The level of investment in an economy affects manufacturing output from the viewpoint of demand as well as supply, and the selection of this variable in lieu of gross domestic capital formation in manufacturing partly reflects the demand for the manufacturing products and partly the increase in production capacity.

A significant degree of association is evident between the growth of manufacturing output and the combined growth factor scores. When the combined growth factor scores in table 9 are correlated with the scores for growth of manufacturing output, a correlation coefficient of 0.80 is obtained. It is interesting to note that in the case of individual correlations between the growth of manufacturing output and individual variables 1 through 7, each coefficient obtained is less than 0.80. Table 10 contains the various observations used in this exercise with the exception of the growth rates of GDP and *per capita* GDP, which are given in tables 4, 5 and 6. Calculated on the basis of these observations, a correlation coefficient of 0.68 is obtained between the growth of manufacturing output and the growth rate of GDP; and the highest correlation coefficient, 0.78, is found between the growth of manufacturing output and the growth rate of *per capita* GDP.

Another interesting finding is that the level of *per capita* GDP does not seem to have a significant relation to the growth of manufacturing output

TABLE 9. GROWTH SCORE OF MANUFACTURING OUTPUT, BY SELECTED DEVELOPING COUNTRIES, 1960—1968

	Score for growth of manufacturing output	*Combined growth factor score*		*Score for growth of manufacturing output*	*Combined growth factor score*
Africa			*Latin America*		
Ghana	45	62	Argentina	20	96
Morocco	16	98	Bolivia	40	147
Southern Rhodesia	13	74	Chile	36	166
Tunisia	31	92	Colombia	28	103
			Costa Rica	44	133
			Dominican Rep.	6	59
Asia			El Salvador	60	132
Ceylon	84	133	Guatemala	44	118
China (Taiwan)	100	268	Honduras	55	131
Indonesia	0	64	Jamaica	33	156
Iraq	21	148	Nicaragua	33	152
Jordan	60	185	Panama	65	210
Korea, Rep. of	93	265	Peru	46	140
Philippines	23	129	Uruguay	1	57
			Venezuela	38	121

Note: For the computation procedure see footnote 5, page 13.

(the correlation coefficient is —0.23).[6] Because of this extremely low correlation, the level of *per capita* GDP was eliminated from the computation and the combined growth factor score, shown in table 9, therefore includes only six variables. The growth rate of agricultural output has a low correlativity with the growth of manufacturing output (a correlation coefficient of 0.32), and the correlation coefficients with the other variables are 0.70 for the growth rate of exports, 0.48 for the percentage of enrolment at the secondary school level in the relevant age group and 0.38 for the growth rate of gross domestic capital formation.

The principal finding appears to be that while the correlation with each individual variable is comparatively low, the combined growth factor score based on all of the variables taken together reveals a significant association with the growth of manufacturing output. In other words, if changes in one of the variables have relatively little impact on the growth of the manufacturing sector, policy measures designed to affect one variable, for example, education, agricultural production or exports, may do little to stimulate the growth of the manufacturing sector. On the other hand, the high correlation obtained with the combined growth factor score implies that economic policies that simultaneously affect a wide range of economic elements may be required to achieve the rapid growth of the manufacturing sector.

[6] This should not be confused with the later discussion on growth elasticity, in which the relationship between the level of manufacturing output and the level of *per capita* GDP is examined. The correlation coefficient above 0.396 is significant at the 99 per cent confidence level.

TABLE 10. PER CAPITA GDP, GROWTH OF AGRICULTURE, EXPORTS AND GROSS DOMESTIC CAPITAL FORMATION AND PERCENTAGE OF SECONDARY SCHOOL ENROLMENT IN RELEVANT AGE GROUP, BY SELECTED DEVELOPING COUNTRIES

	Level of per capita GDP, 1963 (dollars)	*Growth of agricultural output, 1960–1968 (average annual rate)*	*Growth of exports, 1960–1968 (average annual rate)*	*School enrolment in relevant age group, 1965 (per cent)*	*Growth of gross domestic capital formation, 1960–1968 (average annual rate)*
Africa					
Ghana	207	2.2	0.6	27	—4.7
Morocco	168	4.3	3.1	15	10.8
Southern Rhodesia	207	4.7	3.7	3	2.4
Tunisia	200	—3.0	6.4	25	12.1
Asia					
Ceylon	138	1.9	1.4	78	7.5
China (Taiwan)	163	5.5	21.0	58	15.7
Indonesia	79	2.3	—2.5	17	6.6
Iraq	245	5.6	6.0	29	2.7
Jordan	184	7.4	17.5	49	10.4
Korea, Rep. of	135	4.4	39.0	43	24.0
Philippines	235	4.8	5.4	31	10.6
Latin America					
Argentina	522	2.3	3.0	40	1.7
Bolivia	110	1.7	14.7	23	10.6
Chile	301	1.8	8.5	41	33.5
Colombia	257	3.0	2.4	23	4.2
Costa Rica	339	2.0	9.0	37	10.0
Dominican Rep.	263	0.0	—1.2	24	10.8
El Salvador	230	2.9	7.7	19	1.9
Guatemala	283	3.9	8.3	8	7.7
Honduras	198	2.5	12.0	11	9.9
Jamaica	422	2.5	5.1	22	12.5
Nicaragua	279	3.9	13.8	17	10.6
Panama	445	6.1	16.4	46	12.9
Peru	222	2.0	9.5	28	13.6
Uruguay	562	0.3	4.2	57	—4.1
Venezuela	745	6.1	2.0	34	6.6

Sources: UNIDO, based on United Nations, *Yearbook of National Accounts Statistics;* United Nations, *Statistical Yearbook;* ECAFE, *Economic Survey for Asia and the Far East;* and United Nations, *World Economic Survey, 1969* (Sales No.: 71.II.C.1).

DEVELOPMENT OF MAJOR MANUFACTURING INDUSTRY GROUPS

In the ensuing section, attention is given to the changes that have taken place within the manufacturing sector. Not only is this sector probably the least homogeneous of the various sectors in an economy, but its structure is also subject to rapid changes. When the national income increases or a new technology is introduced, or when the economic base of a country is transformed, the structure of the manufacturing sector is also modified. Structural changes within the sector are clearly observable in the historical process of industrialization in the developed countries.[7] While the period discussed in this survey may be too short to permit

[7] The historical transformation is discussed in some detail in chapter V.

TABLE 11. CONTRIBUTION OF MAJOR INDUSTRY GROUPS TO GROWTH OF MANUFACTURING, BY REGION AND ECONOMIC GROUPING, 1960 AND 1969
(Per cent)

	Total manufacturing	Food, beverages and tobacco	Textiles	Wearing apparel; leather products; footwear	Wood products and furniture	Paper, printing and publishing	Chemicals, petroleum, coal, rubber and plastic products	Non-metallic mineral products, except petroleum and coal	Basic metals	Fabricated metal products, except machinery and equipment
ISIC	3	31	321	322–324	33	34	35	36	37	38
Developing countries										
1960	100	29	15	6	4	4	14	5	5	14
1969	100	25	13	5	4	4	16	6	6	18
Asia										
1960	100	17	13	3	4	5	15	5	7	20
1969	100	15	11	4	5	6	15	6	9	30
Latin America										
1960	100	28	11	6	3	5	15	5	6	18
1969	100	25	9	5	3	5	18	5	7	21
Africa										
1963	100	26	12	5	5	6	12	5	7	18
Developed market economies										
1960	100	12	6	5	4	8	13	5	9	36
1969	100	10	5	4	3	8	16	4	9	39
Centrally planned economies										
1960	100	17	6	2	5	3	8	7	9	34
1969	100	14	5	2	4	2	11	7	8	44
World										
1960	100	14	6	4	4	7	11	5	8	34
1969	100	12	5	3	4	6	14	5	8	39

Source: UNIDO, based on United Nations, *Statistical Yearbook*, *Monthly Bulletin of Statistics*, and other data supplied by the United Nations Statistical Office.

TABLE 12. GROWTH OF MAJOR INDUSTRY GROUPS, BY REGION AND ECONOMIC GROUPING, 1960—1971

Average annual rate based on output index numbers

(Per cent)

	Total manufacturing	Food, beverages and tobacco	Textiles	Wearing apparel; leather products; footwear	Wood products and furniture	Paper, printing and publishing	Chemicals, petroleum, coal, rubber and plastic products	Non-metallic mineral products, except petroleum and coal	Basic metals	Fabricated metal products, except machinery and equipment
ISIC	3	31	321	322—324	33	34	35	36	37	38
Developing countries										
1960—1969	6.4	4.5	4.3	6.0	7.0	6.5	7.9	7.3	7.9	8.8
1970	6.6	7.1	6.6	2.0	—3.7	9.4	9.4	9.6	1.9	6.9
1971[a]	7.2	5.8	6.3	...	...	8.1	9.7	3.7	3.2	...
Asia										
1960—1969	7.0	5.1	4.7	9.6	10.0	8.5	7.2	9.2	10.2	11.4
1970	5.9	7.4	8.6	—1.2	14.0	8.0	7.5	10.3	—0.7	7.0
1971[a]	10.4	13.4	7.3	...	...	3.1	12.9	4.4	4.3	6.3
Latin America										
1960—1969	5.7	4.2	3.4	3.6	4.2	6.7	8.0	6.0	7.6	7.5
1970	6.8	5.9	3.8	3.6	6.2	7.2	10.7	8.6	3.1	6.7
Africa										
1960—1969	...	...	...	...	...	...	...	...	...	...
Developed market economies										
1960—1969	6.0	3.8	3.8	2.9	4.1	5.2	8.9	5.3	5.5	6.8
1970	2.1	4.0	—0.8	—2.6	0.0	1.4	5.3	1.4	0.7	2.0
1971[a]	0.3	2.3	3.1	—0.5	3.9	—0.5	4.1	1.2	—4.0	—1.5
Centrally planned economies										
1960—1969	8.6	6.0	5.0	6.4	6.4	7.6	12.2	8.8	7.8	11.6
1970	9.1	6.3	7.2	8.3	7.6	8.8	6.5	11.0	6.5	11.4
1971[a]	8.0	4.6	5.7	6.0	5.0	6.9	11.5	8.2	5.8	11.2
World										
1960—1969	6.7	4.7	4.3	4.3	5.0	5.3	9.6	6.7	6.4	8.4
1970	4.6	5.3	3.8	2.3	2.2	2.1	5.7	6.0	2.7	4.9
1971[a]	3.2	3.8	4.4	2.8	5.3	0.4	6.5	3.9	—0.6	3.3

Source: UNIDO, based on United Nations, *Statistical Yearbook*, *Monthly Bulletin of Statistics*, and other data supplied by the United Nations Statistical Office.

[a] See footnote [a], table 1.

an investigation of distinct structural changes in many developing countries, trends are nevertheless sufficiently apparent for enough countries to allow a comparison of structural differences among economic groupings and developing regions. It is also possible to identify the manufacturing groups having the greater growth potential and to explain the pattern of manufacturing growth by the use of growth and size (population) elasticities.

The growth rates of the major industry groups and their relative contribution to manufacturing output are shown for the period 1960–1970 in tables 11 and 12.[8] Some clear differences are noted in the structure of the manufacturing sector between the developing countries on the one hand and the developed market economies and centrally planned economies on the other. The developing economies exhibit: a relatively larger food, beverages and tobacco industry (ISIC 31) and textile industry (ISIC 32), a relatively smaller basic metals industry (ISIC 37), and a much smaller metal products industry (ISIC 38).

For example, in 1969, the food, beverages and tobacco industry group (see table 11) accounted for 25 per cent of manufacturing output in the developing countries, for 10 per cent in the developed market economies and for 14 per cent in the centrally planned economies. Very substantial differences are also found in the metal products industry group. This group accounted for only 18 per cent of manufacturing output in the developing countries in 1969, whereas its share was 39 per cent in the developed market economies and 44 per cent in the centrally planned economies. Among the developing regions, Asia seems to have a different manufacturing structure with a lower relative share for the food, beverages and tobacco industries and a higher relative share for metal products. The former industry group accounted for only 15 per cent of total manufacturing output in Asia in 1969 as compared with 25 per cent in Latin America in the same year, and 26 per cent in Africa in 1963. Metal products was the largest manufacturing group in Asia, accounting for 30 per cent of total manufacturing output, or almost 10 percentage points higher than the share for that industry group in either of the other developing regions.

The fastest growing manufacturing industries over the period 1960–1969 were chemicals, non-metallic mineral products, basic metals and metal products, irrespective of economic grouping, as seen in table 12. Metal products registered the fastest growth with an average annual rate of 8.8 per cent in 1960–1969 in the developing countries, followed by chemicals and basic metals, each with an average annual rate of 7.9 per cent. Chemicals increased at the fastest rate in both the developed market economies and the centrally planned economies. This no doubt reflected the rapid growth of petrochemical products in the First Development Decade in the developed countries. Chemicals were the only major industry group in the developed market economies whose growth surpassed the growth of the same group in the developing countries. The growth rate for metal products was second to chemicals in the developed market and the centrally

[8] It was not possible at the time of writing this chapter to obtain statistics on 3 or 4 digit ISIC industry groups, according to the revised ISIC, on a regional basis. Therefore, no discussion is possible on the product composition of each group at this time.

planned economies, although there was a sizable difference in their average annual growth rates. Even from the limited amount of data it is clear that metal products, basic metals, chemicals and non-metallic mineral products have been and will continue to be the manufacturing industry groups with the greatest growth potential in the developing countries, not to speak of the developed market and the centrally planned economies. However, the product mix in these industry groups differs considerably between the developed countries and the developing countries. For example, machinery and transport equipment and electrical appliances are the main metal products in the developed countries, whereas these products are not produced on a large scale in the developing countries.

The food processing, textiles and wearing apparel industry groups (ISIC 31, 321, 322–324) registered slow growth in the developed market economies in 1960–1969. The demand for processed foods does not increase proportionally to increases in income, which largely explains the slow growth in the food industry. The export of cotton and synthetic fibre textiles and ready-made clothing from developing countries increased over the decade. Low productivity and profitability appear to be restricting the further development of these manufacturing branches in the developed countries, thus influencing a shift of these industries to a number of developing countries, notably China (Taiwan), Hong Kong and the Republic of Korea. However, this pattern of development does not seem to have been paralleled in other manufacturing branches assumed to be relatively labour intensive. In many developed countries the shortage of labour leads to the adoption of more capital-intensive production methods, so that traditional products continue to be produced along with new manufactured goods which are continually introduced into the market. For example, wood furniture, which is normally a relatively labour-intensive product, is successfully produced and exported by the labour-scarce Scandinavian countries. It may be misleading therefore to assume that the developed countries will cease to produce commodities that are generally considered to be labour intensive. For many such items, there may be a tendency to develop capital-intensive methods of production.

When the developed market economies are taken as a whole the structural changes within the manufacturing sector have been mainly owing to the introduction of new manufactured products such as computers, and shifts in demand for existing products such as automobiles, appliances etc. The change is apparently not the result of shifts in the international division of labour, wherein the developing countries might have certain comparative advantages based on resource endowments and relative factor prices, especially abundant low-wage labour. The structural changes in the manufacturing sector of the developing countries have resulted mainly from the process of import substitution and developments in the area of natural resources. There does not seem to be a pattern whereby the developed countries shift manufacturing production from light industries to heavy industries and the developing countries take over a significant share of the production of light industries. Structural changes in the developed countries do not seem to affect the manufacturing sector of the developing countries, and

a more or less full range of manufactured products continue to be produced and traded among the developed countries. As the data indicate, the growth rates of manufacturing production have increased in all groups in the developed countries. This phenomenon may presage some difficulty for the developing countries in finding export markets for their manufactured goods in the developed market economies.

GROWTH OF MAJOR MANUFACTURING INDUSTRY GROUPS, BY INDIVIDUAL DEVELOPING COUNTRIES

Table 13 gives growth rates for major industry groups in the ISIC three-digit categories for 19 developing countries for which output data were available. Some of these countries achieved extremely high growth for both GDP and manufacturing output, while some experienced a slow growth and rather large fluctuations in the growth of GDP and manufacturing. Some are large countries with a growing domestic market, but the list also includes small countries with few resources. The level of *per capita* GDP varies widely among these 19 countries. In spite of these differences, however, a general trend is clearly observable: that is, growth of the transport equipment, the electrical machinery and the chemicals industry groups exceeded substantially the average for total manufacturing output. In some countries a significant structural change was brought about by this growth.

Among countries achieving high growth rates for manufacturing in general, the transport equipment industry group (ISIC 384) increased at an average annual rate of 21 per cent in China (Taiwan), 44 per cent in Iran, 35 per cent in the Republic of Korea, 23 per cent in Ecuador and 14 per cent in Mexico during the period 1960–1969. Owing to the rapid growth of this industry, its relative share in total manufacturing output increased from 1 to 2.6 per cent in China (Taiwan), from 1.8 to 10.9 per cent in Iran, from 1.4 to 4.5 per cent in the Republic of Korea, and from 3.1 to 4.5 per cent in Mexico.

The output of the electrical machinery industry group (ISIC 383) increased similarly at a high average annual rate of 46.7 per cent in China (Taiwan), 23 per cent in Iran, 31 per cent in the Republic of Korea and 21 per cent in Honduras (1960–1966). As a result, the relative share of this group in manufacturing output increased from 1.4 to 10.1 per cent in China (Taiwan), from 0.7 to 1.4 per cent in Iran and from 0.9 to 2.2 per cent in the Republic of Korea. In Honduras, in spite of the high average annual growth rate of 21 per cent, the relative share of this industry in manufacturing output changed from 0.3 per cent in 1960 to only 0.4 per cent in 1966.

Chemical products, petroleum and petroleum products are other major industry groups recording relatively high growth rates. For example, the output of chemicals (ISIC 351–352) increased at an average annual rate of 25 per cent in the Republic of Korea, 17 per cent in Ecuador and 12 per cent in Mexico. The output of petroleum products (ISIC 354) in China (Taiwan) increased at an average annual rate of 38 per cent in 1960–1969, with this industry's share

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2 OF 4

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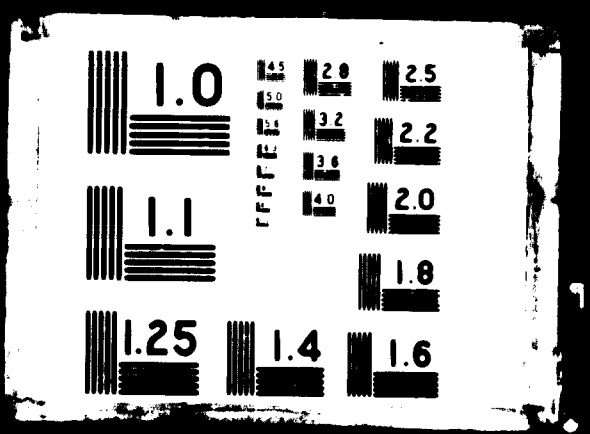

TABLE 13. GROWTH RATE AND DISTRIBUTION OF MAJOR INDUSTRY GROUPS IN THE
(Per

		Food	*Beverages*	*Tobacco*	*Textiles*	*Wearing apparel, except footwear*	*Leather and leather products*	*Footwear, except rubber and plastic*	*Wood, wood and cork products*	*Furniture and fixtures, except metal*	*Paper and paper products*	*Printing and publishing*
	ISIC	*311—312*	*313*	*314*	*321*	*322*	*323*	*324*	*331*	*332*	*341*	*342*
Africa												
Egypt												
Average annual rate of growth	(1960—1969)	7.8	9.5	7.9	3.8	9.7	12.0	...	19.6	2.7	23.7	9.6
Output distribution	(1960)	20.0	2.4	7.2	38.8	1.2	0.6	...	0.1	5.5	1.7	1.4
Output distribution	(1969)	16.4	2.2	5.9	22.4	1.1	1.0	...	0.3	2.9	4.9	1.3
South...n Rhodesia												
Average annual rate of growth	(1960—1969)	4.6	——	1.0——	10.4	——	5.2——	...	——	6.7——	——	3.1 ——
Output distribution	(1960)	13.7	——	14.3——	8.3	——	6.9——	...	——	4.1——	——	9.6 ——
Output distribution	(1969)	12.6	——	9.5——	12.2	——	6.5——	...	——	4.5——	——	7.7 ——
Asia												
Ceylon												
Average annual rate of growth	(1960—1966)	——	1.7——	1.1	6.2	10.7	10.3	...	—1.9	8.1	14.5	1.9
Output distribution	(1960)	——	23.2——	12.8	9.9	4.2	0.3	...	1.4	9.6	1.0	2.5
Output distribution	(1966)	——	18.9——	10.2	10.5	5.7	0.4	...	0.9	11.4	1.8	2.2
China (Taiwan)												
Average annual rate of growth	(1960—1969)	7.2	10.8	3.5	18.0	24.8	8.2	...	14.1	28.4	13.7	10.0
Output distribution	(1961)	37.7	0.5	6.0	13.6	2.2	0.3	...	4.9	0.5	2.8	3.4
Output distribution	(1969)	17.9	0.3	2.2	14.3	3.6	0.1	...	3.2	1.0	2.3	2.0
Cyprus												
Average annual rate of growth	(1962—1969)	9.2	5.0	2.8	13.6	...	10.2	...	7.4	8.9	18.4	9.0
Output distribution	(1962)	16.9	22.2	3.6	1.7	9.3	1.0	...	2.6	6.3	...	4.0
Output distribution	(1969)	16.1	16.3	2.2	0.9	...	0.9	...	2.4	6.0	...	3.9
India												
Average annual rate of growth	(1960—1969)	3.6	——	5.6——	1.1	6.7	—1.2	...	——	11.0——	8.1	...
Output distribution	(1960)	10.7	——	5.2——	26.3	6.4	0.5	...	——	4.8——	1.4	...
Output distribution	(1969)	8.7	——	5.0——	17.3	6.9	0.3	...	——	7.4——	1.7	...
Iran												
Average annual rate of growth	(1962—1969)	5.6	7.8	...	5.0	19.5	12.0	...	...	11.2	...	...
Output distribution	(1962)	16.9	1.0	...	23.3	...	1.7	...	...	1.5	...	...
Output distribution	(1969)	11.7	0.8	...	15.5	...	1.8	...	...	1.5	...	...
Korea, Rep. of												
Average annual rate of growth	(1960—1969)	12.4	11.3	11.3	19.2	12.1	3.3	...	——	19.1——	16.6	12.3
Output distribution	(1960)	22.0	8.3	4.6	25.7	4.4	1.5	...	——	5.0——	2.7	5.1
Output distribution	(1969)	13.6	4.7	2.6	26.8	2.6	0.4	...	——	5.2——	2.3	3.1
Philippines												
Average annual rate of growth	(1960—1969)	5.2	9.4	5.5	2.0	—1.8	—1.3	0.2	6.5	1.9	3.0	—5.3
Output distribution	(1960)	30.1	6.5	4.8	7.2	3.1	0.4	1.0	4.8	0.7	2.0	5.7
Output distribution	(1969)	27.9	8.5	4.5	5.1	1.5	0.2	0.6	4.9	0.5	1.5	2.0
Latin America												
Brazil												
Average annual rate of growth	(1960—1968)	3.1	5.3	5.1	0.8	4.2	2.5	...	...	...	8.6	...
Output distribution	(1960)	17.4	3.0	1.4	12.2	...	1.0	...	...	...	2.6	...
Output distribution	(1968)	14.1	2.8	1.3	8.5	1.6	0.8	...	...	...	3.2	...
Chile												
Average annual rate of growth	(1960—1969)	3.6	3.3	4.4	4.8	3.5	1.1	—0.7	5.5	1.4	6.7	2.2
Output distribution	(1960)	17.7	4.5	0.8	11.9	2.4	1.2	2.1	2.3	0.7	3.8	4.2
Output distribution	(1969)	16.1	4.0	0.8	12.0	2.2	0.9	1.5	2.5	0.5	4.5	3.3
Colombia												
Average annual rate of growth	(1960—1969)	8.5	5.2	4.7	4.1	8.2	6.1	...	——	0.8——	12.7	8.5
Output distribution	(1960)	14.5	14.7	4.3	14.6	4.8	1.1	...	——	2.7——	2.3	2.0
Output distribution	(1969)	18.3	12.6	4.2	12.4	5.8	1.2	...	——	1.7——	3.8	2.3
Dominican Rep.												
Average annual rate of growth	(1960—1968)	—4.1	12.0	9.6	4.6	—4.5	1.0	—4.4	1.1	11.8	15.8	7.5
Output distribution	(1960)	89.6	2.0	0.9	3.8	1.6	0.7	1.2	2.2	0.4	1.0	1.4
Output distribution	(1968)	57.2	7.2	1.7	4.8	1.0	0.7	0.7	2.2	0.8	2.7	2.2
Ecuador												
Average annual rate of growth	(1960—1968)	11.3	3.0	9.3	8.1	10.9	1.1	...	21.5	5.4	50.0	6.7
Output distribution	(1960)	29.6	15.8	1.5	13.2	3.6	1.0	...	2.1	2.5	0.1	4.6
Output distribution	(1968)	29.5	8.4	1.2	10.4	3.5	0.4	...	4.2	...	1.1	3.3
El Salvador												
Average annual rate of growth	(1961—1968)	7.6	1.9	5.2	19.2	6.1	2.3	...	9.7	27.6	—16.9	...
Output distribution	(1961)	38.5	4.6	2.5	10.6	15.1	1.4	...	0.6	2.7	7.6	...
Output distribution	(1968)	32.2	2.4	1.5	18.3	7.1	0.5	...	0.6	8.9	0.9	...
Honduras												
Average annual rate of growth	(1960—1966)	15.6	6.1	1.8	12.6	13.7	12.3	...	7.6	9.2	15.3	30.5
Output distribution	(1960)	28.2	15.0	4.1	2.5	7.6	2.0	...	7.4	1.5	0.8	1.5
Output distribution	(1966)	34.2	10.9	2.3	2.6	8.4	2.2	...	5.8	1.3	0.9	4.1
Mexico												
Average annual rate of growth	(1960—1968)	——	7.2——	1.3	6.9	5.6	3.6	...	2.4	...	8.8	10.0
Output distribution	(1960)	——	33.1——	1.7	11.4	3.9	1.8	...	2.4	...	2.5	2.4
Output distribution	(1968)	——	30.1——	1.0	10.1	3.1	0.7	...	1.5	...	2.5	2.7
Panama												
Average annual rate of growth	(1960—1968)	9.6	8.8	4.5	...	6.3	0.7	...	6.2	11.7	25.0	...
Output distribution	(1960)	38.8	19.6	6.0	...	7.2	1.2	...	3.7	6.2	1.7	...
Output distribution	(1968)	28.9	11.2	2.9	...	4.4	0.4	..	2.0	6.1	4.2	...
Peru												
Average annual rate of growth	(1960—1969)	4.7	9.6	2.6	1.1	9.6	0.2	4.7	——	9.1——	8.6	12.0
Output distribution	(1960)	30.7	6.7	1.7	14.0	1.4	0.9	1.8	——	1.9——	2.6	2.5
Output distribution	(1969)	24.8	8.2	1.2	8.3	1.7	0.5	1.4	——	2.2——	2.9	3.8

Source: UNIDO, based on data supplied by the United Nations Statistical Office.

MANUFACTURING SECTOR, BY SELECTED DEVELOPING COUNTRIES, 1960—1969
(cont)

Industrial chemicals	Other chemical products	Petroleum refineries	Misc. products of petroleum and coal	Rubber products	Plastic products	Pottery, china and earthenware	Glass and glass products	Other non-metallic mineral products	Iron and steel basic industries	Non-ferrous metals basic industries	Fabricated metal products, except machinery and equipment	Machinery, except electrical machinery	Electrical machinery, apparatus, appliances, supplies	Transport equipment	Scientific equipment n. e. s.; photographic, optical goods	Other manufacturing industries
351	352	353	354	355	356	361	362	369	371	372	381	382	383	384	385	390
16.5		-1.1		6.4	...		14.1			9.9	21.3	23.3	23.8	17.8	-28.1	
7.8		7.0		1.6	...		2.1			3.7	4.2	1.1	2.6	1.5	2.4	
12.8		2.6		1.2	...		2.9			3.6	9.8	3.1	7.2	2.9	9.2	
		6.3			...		1.0				8.9			6.2	0.9	
		10.2			...		8.1				18.5			5.6	1.0	
		10.7			...		5.4				27.2			5.9	0.7	
8.2		...	...	18.5	...		4.3		20.0		23.7	...	...	...	56.2	
11.7		...	...	3.4	...		6.8		...		3.0	...	...	...	0.3	
13.9	...	...	...	6.8	...		6.5		0.1		7.7	...	...	...	3.1	
22.7	7.3	14.7	37.9	21.0	38.4	12.4	17.4	6.5	12.3	...	11.4	14.7	46.7	21.2	10.6	
2.1	4.4	4.5	0.8	1.0	1.3	0.6	0.8	6.7	2.4	...	2.3	1.8	1.4	1.0	...	...
3.0	2.2	4.1	2.9	1.3	5.0	0.5	0.8	3.1	1.8	...	1.7	1.9	10.1	2.6	0.1	
...	...	...	...	5.4	...	...	...	...	...	...	9.2	10.4	7.3	5.1	21.8	
...	2.3	...	...	1.0	...	...	...	13.2	...	...	5.3	2.0	1.0	...	1.0	
...	...	...	...	0.9	...	...	...	...	...	...	...	2.4	0.7	...	2.6	
9.0		12.2		8.9	...		6.4		8.6		8.2	15.0	14.0	3.3	-5.1	
6.3		1.1		1.4	...		6.4		5.9		6.6	2.2	2.2	4.5	7.0	
8.1		1.9		1.8	...		6.6		7.4		8.0	4.6	4.3	3.6	2.6	
14.9		...	...	14.0	...		11.9		...	...	11.0	6.9	22.6	44.3	17.1	
3.3		...	...	0.6	...		6.2		...	...	5.7	0.8	0.7	1.8	...	...
4.2		...	...	0.7	...		6.5		...	...	5.6	0.6	1.4	10.9	...	...
25.0		28.7		8.6	...		18.2		16.9		15.1	11.6	30.8	35.0	20.8	
6.3		1.9		2.8	...		4.5		4.8		1.4	4.0	0.9	1.4	1.1	
10.1		3.9		1.3	...		4.4		4.2		1.1	2.3	2.2	4.5	1.3	
4.8		6.8		5.4	...	7.3	...	...	...	...	9.3	4.7	11.0	12.2	-3.6	
7.8		8.8		3.8	...	...	1.4	3.0	...	...	3.1	2.1	1.8	1.9	1.6	
6.9		9.3		3.6	...	...	...	...	...	...	4.1	1.9	2.6	3.1	0.8	
10.4		...	...	8.1	...		5.3			5.1		2.7	9.8	0.8	...	...
7.8		...	...	1.8	...		5.7			12.4		...	5.3	9.3	...	...
10.9		...	...	2.1	...		5.5			11.8		2.5	7.2	11.7	...	...
-3.0	0.0	10.2	...	6.7	...	5.3	4.8	5.5	5.9	9.8	7.6	0.8	7.5	-4.3	2.4	
2.7	6.6	2.2	...	2.3	...	0.5	0.9	3.0	5.5	11.7	4.0	3.2	2.9	3.9	2.3	
1.4	4.4	3.5	...	2.7	...	0.5	0.9	3.2	6.6	17.9	5.1	2.1	3.7	1.7	1.9	
6.0		6.1		4.1	...		5.1		5.0			7.5			...	...
9.9		2.9		3.4	...		6.0		2.6			10.0			...	...
9.5		3.1		2.7	...		5.3		2.2			11.5			...	...
2.5	10.2	...	...	13.7	...	...	10.4	8.2	2.7	...	-2.9	...	20.4	17.3	12.8	
2.2	1.9	...	...	0.8	...	...	0.8	2.5	...	...	1.0	...	0.1	0.7	...	...
2.4	3.6	...	...	2.1	...	...	1.6	4.3	...	...	0.7	...	0.4	2.3	...	...
17.2		8.7		31.7	...		12.2		...	...	17.2	...	21.1	23.0	26.8	
4.2		...	...	1.6	...		6.1		...	...	2.6	...	0.3	...	...	...
6.3		...	...	2.3	...		6.5		...	...	4.0	...	0.5	...	...	...
34.5	10.7	...	...	11.3	...	...	...	5.4	...	...	6.9	...	...	...	...	...
3.3	...	...	...	0.9	...	...	...	...	...	...	2.1	...	...	...	...	...
10.1	...	...	...	0.7	...	...	...	...	...	...	1.6	...	...	...	...	...
9.6		...	...	11.7	...		18.3		...	...	14.9	...	28.9	...	...	23.5
4.8		...	...	1.8	...		6.6		...	...	3.1	...	8.3	...	...	...
4.3		...	...	1.8	...		9.2		...	...	3.6	...	8.4	...	...	...
11.7		7.4	...	10.8	...		8.5		10.7	...	9.6	10.9	...	13.6	8.6	
8.9		6.8	...	1.9	...		4.0		...	...	3.6	1.3	...	3.1	1.6	
11.3		6.2	...	2.2	...		4.0		...	...	3.9	1.6	...	4.5	1.6	
10.8		16.3	...	4.6	...		9.1		42.8	...	...	...	...	...	...	20.8
5.2		...	...	0.7	...		13.7		...	...	...	...	...	...	...	...
4.3		6.0	...	0.3	...		9.8		...	...	...	...	...	...	...	...
12.2	13.0	6.6		4.7	...	9.6	8.7	7.3	4.8		17.4				15.7	
1.2	3.3	...	...	1.2	...	...	0.8	3.2	16.0		6.4				1.1	
1.8	3.3	...	...	1.0	...	...	0.9	3.2	12.8		14.3				2.2	

in total manufacturing output rising from 0.8 to 2.9 per cent. In the Republic of Korea, the output of petroleum refining and allied products (ISIC 353 -354) grew at an average annual rate of 29 per cent in 1960—1969 and their share in total manufacturing output changed from 1.9 to 3.9 per cent over the same period.

In countries experiencing low growth rates for the manufacturing sector in general, a similar pattern is observable for these same manufacturing industries. The growth rates of chemicals, petroleum products, electrical machinery and transport equipment were much greater than the growth rates of total manufacturing output. For example, the output of transport equipment (ISIC 384) increased at an average annual rate of 12 per cent in the Philippines, which was twice the growth rate of total manufacturing, and 17 per cent in the Dominican Republic where manufacturing output increased at an average annual growth rate of 1.5 per cent over the same period. The Arab Republic of Egypt, Panama and Peru follow the same pattern, as seen in table 13. Exceptions are India where the transport equipment industry grew at an average annual rate of 3 per cent, and Chile where a negative growth was recorded for this industry. However, in India and Chile the output of the electrical machinery industry (ISIC 383) registered increases at average annual rates of 14 per cent and 7.5 per cent respectively in 1960—1969. Similar high performances for this group were recorded in the Philippines (11 per cent), Brazil (9.8 per cent) and the Dominican Republic (20 per cent). Accordingly, its relative share in total manufacturing output in these three countries changed substantially.

Chemicals, petroleum and petroleum products increased at a rapid rate in most of the low-growth countries. Chemicals (ISIC 351—352) grew at an average annual rate of 8.2 per cent in Ceylon, 9 per cent in India and 10.4 per cent in Brazil. The fast growth of these industry groups brought about significant changes in their relative magnitude in total manufacturing, although they continued to produce only a comparatively small proportion of total output. The main income in the manufacturing sector was generated by the food, beverages and tobacco, textile and wearing apparel industries.

Despite their over-all growth performance, the developing countries generally evidenced slower growth in the food, beverages and tobacco group (ISIC 311—314) than for total manufacturing output, explaining a decline in that industry group's relative share in total manufacturing output.

The high-growth countries generally recorded higher growth rates for the food, beverages and tobacco industries than the low-growth countries, but the growth rates were nevertheless also lower in these countries than the average for all manufacturing. For example, food products (ISIC 311—312) in China (Taiwan) increased at an average annual rate of 7.2 per cent in 1960—1969, at the same time that this industry's relative share of total manufacturing output was reduced from 37.7 per cent in 1960 to 17.9 per cent in 1969. In India, the average annual growth rate for food products was 3.6 per cent over the same period, and its relative share of total manufacturing decreased from 10.7 per cent to 8.7 per cent. In the Dominican Republic, the food manufacturing sector declined in absolute terms, recording an average annual growth rate of —4 per

cent in 1960—1968, resulting in a reduction of its relative share of total manufacturing output from 89.6 per cent in 1960 to 57.2 per cent in 1968. The textile and wearing apparel industry groups (ISIC 321—322) also evidenced slow growth in many countries, although there were some notable exceptions such as China (Taiwan) and the Republic of Korea, which expanded their markets to North America and Asia.

No other general trend among the other manufacturing industries is discernible from the data in table 13. An extremely high growth rate was achieved by some manufacturing industry groups in one or two countries, but these same groups did not perform well in other countries. Paper and paper products output (ISIC 341), for example, increased in the Dominican Republic at an average annual rate of 15.8 per cent in 1960—1968, a rate that is far above the average for manufacturing, but the same group did not achieve above average growth in other countries.

At the ISIC three-digit level it may be seen then that the relative share of the major industry groups in manufacturing output varies substantially in these 19 developing countries from one group to another, except for food processing (ISIC 311—314) and textiles (ISIC 321—322), which account for more than one third of manufacturing output. As has been mentioned, the trend seems to be towards an increase in the importance of metal products, especially transport equipment (ISIC 384), electrical machinery (ISIC 383), chemicals (ISIC 351—352) and petroleum and petroleum products (ISIC 353—354), and towards a gradual decline in the importance of the food, beverages and tobacco sector (ISIC 311—314). This trend has resulted in significant changes in the structure of the manufacturing sector.

At this point it should be noted that these fast-growing industries generally lend themselves to economies of scale. In the light of this, developing countries with a large domestic market are in a better position to diversify their manufacturing activities, but the smaller developing countries may be forced to specialize in a few manufacturing activities depending on the size of the domestic market and the accessibility of export markets.

FACTORS AFFECTING THE PATTERN OF GROWTH OF MANUFACTURING

In this section the growth of major manufacturing industry groups is related to the growth of *per capita* GDP and to the size of population. The purpose of this exercise is to examine the extent of the impact of two major factors on the pattern of growth of manufacturing. In the following analysis the size of a country is expressed in terms of its population. Data on manufacturing output for 1963 are used. These cross-country data were collected from 65 developing countries. They cover industries in the ISIC three-digit category, and they are related to *per capita* GDP and the population in the same year (1963) by the use of a logarithmic function:

$$\log V_i = C + a_i \log y + b_i \log p$$

where V_i = output of i group in \$1,000,
y = *per capita* output in dollars,
p = population in 1,000s,
a_i = growth elasticity of i industry group,
b_i = size elasticity of i industry group, and
C = constant term.

The growth elasticity a indicates the increase of manufacturing output of a particular manufacturing industry group in response to a one-unit increase of *per capita* GDP, whatever the unit may be. For example, a 1 per cent increase in *per capita* GDP is associated with the growth elasticity a_i per cent increase in the manufacturing output of the i industry group. Size elasticity b indicates the relationship between population increases and the manufacturing output of the i industry group in the same manner as growth elasticity. (Table 14 gives the growth and size elasticities for 23 major manufacturing industry groups.)

The output of most manufacturing industry groups varies in the same direction as changes in *per capita* income. The production of tobacco manufacturing, however, increases less than proportionally with the growth of *per capita* income. High growth elasticities are found in the paper and paper products industry, chemicals such as paint, soap and drugs, rubber products, plastic products, the iron and steel industries, and machinery, electrical machinery and transport equipment. This finding is not new and corresponds to the discussion in the previous section. These industries are fast-growing manufacturing activities in which growth in output has responded more than proportionally to increases in *per capita* GDP. As an example, for every 1 per cent increase in *per capita* GDP, the production of machinery, excluding electrical machinery, may be expected to increase 1.98 per cent, whereas the output of the food-processing group increases only 1.23 per cent. As *per capita* income rises, the structure of the manufacturing sector is bound to change owing to differences in the growth elasticity of the various industry groups. The implication of growth elasticity for development planning is that a developing country may try to concentrate on the selection of manufacturing projects with high-growth rather than low-growth elasticities.

The size elasticity coefficient indicates the effect of the size of a country (in terms of population) on the manufacturing industries. In some industries efficiency is known to be greatly affected by the size of operations, which in turn is influenced by the size of the market. It must be acknowledged that a small developing country could develop a successful export industry without much dependence on the domestic market. In such cases the size elasticity may not have much meaning and size might more appropriately be measured by the level of industrialization, which would suggest the level of external economies available for appropriation for any given project in the manufacturing sector. It will be noted, however, that the size elasticities presented in this discussion seem to confirm that population is in fact an important variable.

TABLE 14. GROWTH AND SIZE ELASTICITIES OF 23 MAJOR INDUSTRY GROUPS

ISIC[a]	Growth and size elasticity	R^{2b}	Sample size
311—312	$\log V_{311\text{-}312} = -4.27 + 1.23 \log \gamma + 0.94 \log p$ (0.14) (0.07)	0.73	65
313	$\log V_{313} = -5.17 + 1.37 \log \gamma + 0.80 \log p$ (0.16) (0.08)	0.63	65
314	$\log V_{314} = -5.15 + 0.98 \log \gamma + 1.00 \log p$ (0.14) (0.07)	0.76	63
321	$\log V_{321} = -9.22 + 1.10 \log \gamma + 1.45 \log p$ (0.21) (0.12)	0.73	60
322	$\log V_{322} = -8.50 + 1.65 \log \gamma + 0.95 \log p$ (0.24) (0.11)	0.65	48
323	$\log V_{323} = -8.93 + 1.36 \log \gamma + 1.02 \log p$ (0.19) (0.10)	0.68	53
324	$\log V_{324} = -5.95 + 1.25 \log \gamma + 0.83 \log p$ (0.21) (0.11)	0.60	47
331	$\log V_{331} = -6.06 + 1.10 \log \gamma + 0.97 \log p$ (0.18) (0.09)	0.87	60
332	$\log V_{332} = -6.41 + 1.24 \log \gamma + 0.89 \log p$ (0.16) (0.08)	0.68	63
341	$\log V_{341} = -16.50 + 2.11 \log \gamma + 1.44 \log p$ (0.28) (0.14)	0.70	51
342	$\log V_{342} = -8.74 + 1.55 \log \gamma + 1.02 \log p$ (0.13) (0.07)	0.80	64
351	$\log V_{351} = -11.29 + 1.57 \log \gamma + 1.22 \log p$ (0.28) (0.13)	0.72	37
352	$\log V_{352} = -12.56 + 1.76 \log \gamma + 1.35 \log p$ (0.19) (0.97)	0.84	42
353	$\log V_{353} = -4.71 + 1.54 \log \gamma + 0.62 \log p$	0.36	17
355	$\log V_{355} = -13.84 + 1.82 \log \gamma + 1.35 \log p$ (0.22) (0.11)	0.76	55
356	$\log V_{356} = -10.93 + 2.09 \log \gamma + 0.86 \log p$ (0.45) (0.16)	0.88	10
361	$\log V_{361} = -13.16 + 1.48 \log \gamma + 1.30 \log p$ (0.71) (0.29)	0.56	19
362	$\log V_{362} = -13.17 + 1.61 \log \gamma + 1.33 \log p$ (0.33) (0.16)	0.75	28
369	$\log V_{369} = -8.42 + 1.51 \log \gamma + 1.05 \log p$ (0.23) (0.10)	0.75	38
371	$\log V_{371} = -18.12 + 2.20 \log \gamma + 1.58 \log p$ (0.48) (0.26)	0.65	25
372	$\log V_{372} = -5.68 + 1.39 \log \gamma + 0.66 \log p$ (0.75) (0.38)	0.19	22
381	$\log V_{381} = -11.14 + 1.68 \log \gamma + 1.22 \log p$ (0.12) (0.06)	0.87	61
382	$\log V_{382} = -13.72 + 1\ 98 \log \gamma + 1.23 \log p$ (0.23) (0.12)	0.72	52
383	$\log V_{383} = 17.19 + 2.30 \log \gamma + 1.41 \log p$ (0.25) (0.12)	0.74	55
384	$\log V_{384} = -11.92 + 1.72 \log \gamma + 1.25 \log p$	0.67	49

Note: Data for the petroleum products industry group (354) are available for only 7 countries; therefore no significant result is obtained.

Source: UNIDO, based on United Nations, *The Growth of World Industry — 1969 Edition: Vol. I — General Industrial Statistics 1960—1968* (Sales No.: 71.XVII.6), and data supplied by the United Nations Statistical Office.

[a] See table 13 for definitions of these ISIC industry groups.

[b] R^2 indicates the coefficient of determination.

It is especially noteworthy that relatively large size-elasticity coefficients are registered for those industries shown in table 14 in which economies of scale are thought to play a major role. The largest size-elasticity coefficient (1.58) is found in the iron and steel basic industries (ISIC 371), which suggests that the output of these industries increases more than proportionally with the population increase. Paper and paper products (ISIC 341), chemicals (ISIC 351–352), textiles (ISIC 321), rubber products (ISIC 355), glass and glassware products (ISIC 362), metal products (ISIC 381), electrical machinery (ISIC 383) and transport equipment (ISIC 384) register high size elasticities. When they are compared with other groups indicating a size elasticity close to 1 or less than 1, such as food, beverages, clothing, footwear, wood products, printing and plastic products, it is clear that these latter industries are less subject to economies of scale than those with a high size elasticity. This finding suggests that a small country may have a limited choice of industries for development. The exception would be a country whose industrial development is based on the overseas market for specific commodities.

The conclusion is then that for many countries there are especially difficult hurdles to surmount on the road to industrialization. The effort by the developing countries to promote products that are internationally competitive in terms of price and quality must be accompanied by a willingness on the part of the developed countries to permit easier access to their markets for the manufactures of the developing countries.

Chapter II

FOREIGN TRADE AND INDUSTRIALIZATION

INTRODUCTION

International trade is closely interrelated with the process of industrialization. As a first step towards assessing the impact of industrialization on trade patterns, this chapter examines recent trends in exports and imports of manufactured products. As the Second Development Decade progresses, more complete data on the First Development Decade are becoming available, thus facilitating this type of economic analysis.

Since many of the developed countries have either begun or propose to implement generalized preference schemes, the potential effects of these schemes on the interrelationships between trade and development are appraised. Further, with the initiation of generalized preference schemes, non-tariff distortions may take on added importance, and they are therefore also considered here.

GROWTH OF WORLD TRADE

In general, the rate of growth of both exports and imports has recovered in recent years from the slowdown experienced in 1967. Table 15 indicates that world exports increased to achieve a rate of 14.4 per cent in 1969 and maintained this healthy growth rate in 1970. The rate of increase was highest for the developed market economies. The pattern of export growth differed, however, for individual countries, regions and economic groupings. The export growth rates of the European developed market economies and Japan declined in 1970 relative to 1969, while the rate of growth of US exports expanded in 1970 after having remained at the 1968 level in 1969. In contrast, the growth in exports of the centrally planned economies, which did not slacken in 1967, continued to increase in the period 1968—1970. Much of this expansion seems to have been accounted for by exports from centrally planned economies other than the USSR.

With regard to the experience of the developing countries, while the export growth rate improved in 1969 over 1968, in 1970 it fell back to the 1968 level. Had it not been for the continued expansion of exports from Asia, the growth rate for the developing countries would have been much lower. Thus, the developing countries did not achieve a growth rate equal to that of world exports over the three years, although the growth rate for the Asian countries approached the world average.

TABLE 15. ANNUAL GROWTH RATES OF WORLD TRADE, BY ECONOMIC GROUPING AND SELECTED COUNTRIES, 1968—1970

(Per cent)

	Exports, f.o.b.			*Imports, c.i.f.*		
	1968	*1969*	*1970*	*1968*	*1969*	*1970*
Developing countries	9.7	11.5	9.9	9.0	9.1	9.6
Africa	16.9	15.5	8.0	5.3	8.5	12.2
Asia	10.5	11.2	12.3	9.3	9.6	8.7
Latin America	3.9	9.6	8.5	10.2	7.8	9.7
Developed market economies	12.4	15.2	15.5	12.1	14.9	15.1
EEC	14.4	17.9	16.8	12.6	21.9	16.8
EFTA	8.4	14.9	12.5	6.7	10.0	15.1
Japan	24.2	23.3	20.8	11.4	15.7	25.2
US	9.5	9.5	13.7	23.3	8.5	10.9
Centrally planned economies	9.1	10.7	11.5	8.2[a]	10.4[a]	14.4[a]
USSR	10.2	9.6	9.8	10.2[a]	9.7[a]	13.7[a]
World	11.8	14.4	14.4	11.5	13.7	14.0

Source: UNIDO, *Industrial Development Survey*, Vol. III (Sales No.: 71.II.B.15), p. 29, and based on United Nations, *Monthly Bulletin of Statistics*, various issues.

[a] Imports, f.o.b.

As the data in table 15 indicate, the growth rates of world imports followed a pattern somewhat similar to that for exports. While this similarity was also observed for the developed market economies, in 1970 the growth of imports to the centrally planned economies was somewhat more dynamic than the growth of exports from these countries. The growth rate of imports to developing countries changed little from 1968 to 1969, and increased only slightly in 1970.

If the changes in growth rates over the period 1969—1970 are viewed for the developing regions as a whole, there appears to be an inverse relationship between exports and imports. When attention is focused on particular regions, it is evident that a slackening growth in exports for Africa and Latin America coincided in each case with an accelerated rate of import growth, whereas the continued expansion in the export growth rates of Asia was accompanied by a slowdown in the growth of imports. These phenomena seem to indicate a worsening of the African and Latin American balance of trade.[9]

If they are viewed apart from data for the developed market economies, however, the recent growth rates of exports and imports of developing countries have been dynamic. Compared with the 1960—1967 averages (6.3 per cent for exports and 5.2 per cent for imports), and especially with 1967 figures (2 and 4 per cent respectively), the magnitude of contemporary growth rates is indeed impressive. The achievement of the developing countries is somewhat diminished only when it is compared with the performance of the developed market economies over the 1968—1970 period.

The foregoing has provided a general perspective of international trade. A more specific understanding of recent developments in the relationship between

[9] For Latin America, this adverse effect may be particularly severe since over the longer 1967—1970 period the average rate of growth of exports (7.3 per cent) was much below the average growth of imports (9.2 per cent).

industrialization and international trade may be gained by examining trade in manufactured goods. In the analysis that follows reference is made periodically to total trade, which affords a reasonable basis for judging the degree of success of trade in manufactures.

Growth of manufactured exports

The assumption that exports of primary products will not increase rapidly enough to finance the imports needed for development has often been the basis for emphasizing the role of exports of manufactures. Thus, it is important to analyse the flows of manufactured exports to better understand their composition and direction. Consideration is given here to products included in SITC commodity groups 5–8. The products involved are: chemicals (SITC 5), machinery and transport equipment (SITC 7), and other manufactures (SITC 6 and 8); they are usually considered as manufactures in analyses of trade data. A number of processed primary products are not included. The trade flow of these products, which fall into the SITC 0–4 groups, is given in table 27.

As seen in table 16, during a period when the value of total world exports (SITC 0–9) more than doubled, the percentage share of the developing countries steadily declined (from 21.5 per cent in 1960 to 18.3 per cent in 1969). In the same period the share of the developed market economies of total exports improved from 66.8 per cent to 70.8 per cent.

If attention is turned from total exports to manufactured exports, the performance of the developing countries is seen to be much more encouraging. In a world where manufactured exports were increasing more rapidly than total exports (total exports increased by 114.1 per cent over the decade 1960–1969, while manufactured exports rose by 152.5 per cent), the developing countries increased their share of these exports substantially, from 5.5 per cent in 1960 to 6.7 per cent in 1969. This increase meant a 21.8 per cent improvement in their relative position. For the centrally planned economies, both total and manufactured exports have declined in recent years relative to total world exports. The position of the developed market economies has changed only slightly in recent years.

The relative position of the centrally planned economies declined for each of the commodity groups comprising manufactures. In contrast, the relative position of the developing countries improved for exports of all manufactured goods. Their relative position for exports of chemicals, however, improved less than 10 per cent, whereas for exports of other manufactures (SITC 6 and 8) and machinery and transport equipment, it improved 28 and 100 per cent respectively. The relative position of the developed market economies improved for exports of both chemicals and machinery and transport equipment. For other manufactures (SITC 6 and 8), however, it was consistently below that in 1960.

In summary, the exports of manufactured goods from developing countries were capturing a progressively larger share of the world market over the First Development Decade. The expansion was especially dramatic for other manu-

Table. 16. VALUE OF EXPORTS, BY ECONOMIC GROUPING, 1960—1969

Commodity group (SITC)	Year	Exports from			
		World (billion dollars f.o.b.)	Developing countries	Developed market economies	Centrally planned economies
			Per cent of total		
Total exports (0—9)	1960	127.4	21.5	66.8	11.8
	1961	133.1	20.8	67.5	12.3
	1964	172.0	20.0	68.2	11.8
	1965	186.4	19.6	68.8	11.7
	1968	239.1	18.6	70.1	11.3
	1969	272.7	18.3	70.8	10.9
Manufactures (5—8)	1960	69.7	5.5	82.3	12.2
	1961	73.5	5.4	82.4	12.2
	1964	98.8	5.6	81.8	12.6
	1965	10.97	5.8	82.1	12.1
	1968	150.2	6.5	82.8	10.7
	1969	176.0	6.7	83.1	11.1
Chemicals (5)	1960	7.5	3.9	86.5	8.8
	1961	7.9	4.1	86.6	9.2
	1964	10.9	4.1	87.0	8.6
	1965	12.2	4.2	87.0	8.9
	1968	17.0	4.2	88.1	7.7
	1969	19.3	4.3	88.1	7.4
Machinery and transport equipment (7)	1960	27.7	0.7	86.0	13.5
	1961	30.1	0.8	86.9	12.5
	1964	40.9	0.8	85.5	13.6
	1965	45.7	0.9	85.9	13.2
	1968	65.6	1.2	86.8	12.0
	1969	77.3	1.4	87.3	11.3
Other manufactures (6—8)	1960	34.5	9.7	78.5	11.8
	1961	35.5	9.7	77.7	12.7
	1964	47.0	10.1	77.4	12.5
	1965	51.8	10.6	77.5	11.9
	1968	67.6	12.3	77.6	10.1
	1969	79.5	12.4	77.8	9.7

Source: UNIDO, based on United Nations, *Monthly Bulletin of Statistics*, March issue, various years.
Note: Figures do not add to the total, which includes, among others, figures for islands in the Caribbean and the Pacific.

factures (SITC 6 and 8). This phenomenon was in contrast to the total trade position of developing countries. If their relative share of the export market for manufactures had not increased, their percentage share of total exports would have declined still further.

An important question arises from this observation: in what market are the developing countries gaining importance? Table 17 indicates the answer. Exports of total manufactures from all developing countries went increasingly to the developed market economies throughout the First Development Decade. At the beginning of the decade nearly 30 per cent of the manufactured exports of developing countries went to other developing countries; by 1970 this figure had declined to only 25 per cent. In line with this trend, the developed market

TABLE 17. EXPORTS OF MANUFACTURES BY ORIGIN AND DESTINATION, 1960—1969

Exports from	Exports to			
	World (million dollars)	Developing countries	Developed market economies	Centrally planned economies[a]
		Per cent of total		
Developed market economies				
1969	146,330	20.6	74.7	4.0
Centrally planned economies[a]				
1969	17,883	14.6	14.2	68.7
Developing countries[b,c]				
1960	3,840	29.7	66.8	2.5
1961	3,975	31.6	65.3	2.2
1964	5,485	29.2	67.0	3.1
1965	6,395	29.7	66.2	3.8
1968	9,810	25.1	70.9	3.4
1969	11,800	25.1	70.6	3.5
Africa[c]				
1960	1,316	22.5	74.0	2.7
1961	1,311	22.7	73.9	2.1
1964	1,580	15.8	81.1	3.2
1965	1,457	18.7	75.6	5.7
1968	2,081	13.2	80.5	6.1
1969	2,630	11.6	79.8	6.2
Asia[b]				
1960	2,124	44.6	50.7	3.1
1961	2,265	46.0	50.0	2.6
1964	3,158	37.9	56.5	4.6
1965	3,491	36.3	59.4	3.8
1968	5,285	30.4	65.7	3.5
1969	6,414	30.3	65.7	3.5
Latin America				
1960	800	10.4	87.1	0.4
1961	823	11.8	85.3	0.5
1964	1,110	25.1	74.0	0.5
1965	1,284	26.6	72.1	1.1
1968	2,060	26.7	72.0	1.1
1969	2,270	28.0	70.7	1.1

Source: UNIDO, based on United Nations, *Monthly Bulletin of Statistics*, March 1966 and March 1971.
Note: Figures do not add to the total, which includes, among others, figures for islands in the Caribbean and the Pacific.
[a] Includes Asian centrally planned economies, which are the People's Republic of China, the Democratic People's Republic of Korea and the Democratic Republic of Viet-Nam.
[b] Includes Israel.
[c] Includes South Africa, 1960, 1961 and 1964.

economies received approximately 71 per cent of the exports of manufactured goods from developing countries in 1969 as compared with approximately 67 per cent in 1960. And centrally planned economies received 3.5 per cent in 1969 as compared with 2.5 in 1960.

These movements strongly reflected the experience of Africa and Asia. Both developing regions exported more manufactures to developed market economies at the end of the decade than at the beginning. Exports of these products from Africa to developing countries declined from 22.5 per cent of

TABLE 18. EXPORTS OF CHEMICALS (SITC 5) BY ORIGIN AND DESTINATION, 1960—1969

Exports from	Exports to			
	World (million dollars)	Developing countries	Developed market economies	Centrally planned economies[a]
			Per cent of total	
Developed market economies				
1969	17,000	23.6	70.4	5.9
Centrally planned economies[a]				
1969	1,420	14.5	26.0	57.9
Developing countries[a]				
1960	290	36.2	60.3	3.1
1961	320	39.1	54.7	3.4
1964	445	48.3	47.2	3.1
1965	510	48.0	47.1	4.7
1968	720	47.2	45.1	7.5
1969	830	50.0	42.8	6.6
Africa[a]				
1960	91	39.6	56.0	2.2
1961	110	40.0	54.5	—
1964	115	40.9	56.5	1.7
1965	100	49.0	49.0	5.0
1968	130	34.6	46.9	18.5
1969	135	33.3	44.4	20.7
Asia[a]				
1960	111	58.6	34.2	0.9
1961	133	60.2	31.6	1.5
1964	181	65.7	29.3	3.3
1965	203	58.6	34.5	3.0
1968	272	58.5	34.2	6.6
1969	336	64.3	31.5	3.0
Latin America				
1960	110	13.6	85.5	1.8
1961	105	11.4	81.0	1.9
1964	155	34.8	61.9	3.2
1965	160	37.5	58.8	4.4
1968	240	47.9	45.8	5.8
1969	265	49.1	45.3	6.4

Source: UNIDO, based on United Nations, *Monthly Bulletin of Statistics*, March 1966 and March 1971.
Note: Figures do not add to the total, which includes, among others, figures for islands in the Caribbean and the Pacific.
[a] Other countries included in these statistics for the economic groupings and regions are given in the footnotes to table 17.

the total to 11.6 per cent, and exports of manufactures from Asia to developing countries went down from 44.6 per cent to just over 30 per cent.[10] Only Latin America was becoming less dependent on the market of the developed market economies, with 87 per cent of its manufactured exports going to developed market economies in 1960, but only about 71 per cent in 1969. Over the same

[10] The declining importance of developing country markets for Asian and African manufactures might indicate a significant parallel development of the various manufacturing sectors.

TABLE 19. EXPORTS OF MACHINERY AND TRANSPORT EQUIPMENT (SITC 7) BY ORIGIN AND DESTINATION, 1960—1969

Exports from	Exports to			
	World (million dollars)	Developing countries	Developed market economies	Centrally planned economies[a]
		Per cent of total		
Developed market economies				
1969	67,450	23.0	72.1	3.6
Centrally planned economies[a]				
1969	8,753	15.1	6.2	77.5
Developing countries[a]				
1960	190	71.1	26.3	1.6
1961	225	71.1	27.1	0.9
1964	310	72.6	24.8	0.3
1965	395	69.6	29.1	0.8
1968	760	48.0	50.0	0.9
1969	1,080	47.2	51.9	0.8
Africa[a]				
1960	65	76.9	20.0	—
1961	71	81.7	12.7	—
1964	65	72.3	26.2	—
1965	47	70.2	27.7	—
1968	61	39.3	57.4	1.6
1969	65	40.0	58.5	1.5
Asia[a]				
1960	144	84.0	13.2	2.1
1961	172	77.9	19.2	1.2
1964	222	78.4	21.2	0.5
1965	278	69.1	29.5	1.1
1968	513	47.4	51.1	1.0
Latin America				
1960	20	35.0	65.0	—
1961	28	39.3	60.7	—
1964	55	72.7	27.3	—
1965	64	79.7	18.8	—
1968	160	58.8	40.0	—
1969	225	55.6	42.7	—

Source: UNIDO, based on United Nations, *Monthly Bulletin of Statistics*, March 1966 and March 1971.
Note: Figures do not add to the total, which includes, among others, figures for islands in the Caribbean and the Pacific.
[a] Other countries included in these statistics for the economic groupings and regions are given in the footnotes to table 17.

period the share of this region's manufactured exports to developing countries nearly tripled. It is possible that the Latin American experience has been influenced by the various economic integration schemes that are being implemented there; this phenomenon is analysed later in this chapter.

Tables 18—20 indicate that among the individual commodity classes, intra-developing countries' trade relative to total developing countries' exports increased only in chemicals. The upsurge in the exports of this commodity group from Latin America was paralleled by the growing importance of Asian

TABLE 20. EXPORTS OF OTHER MANUFACTURES (SITC 6 AND 8) BY ORIGIN AND DESTINATION, 1960–1969

Exports from	*Exports to*			
	World (million dollars)	*Developing countries*	*Developed market economies*	*Centrally planned economies*[a]
		—*Per cent of total*		
Developed market economies				
1969	61,880	17.2	78.7	3.9
Centrally planned economies[a]				
1969	7,710	14.1	21.2	60.6
Developing countries[a]				
1960	3,360	26.8	69.6	2.5
1961	3,430	28.3	68.8	2.2
1964	4,730	24.5	71.7	3.3
1965	5,490	25.1	70.7	3.9
1968	8,330	21.1	75.0	3.3
1969	9,890	20.6	75.0	3.5
Africa[a]				
1960	1,160	18.1	78.4	2.9
1961	1,130	17.3	79.6	2.4
1964	1,400	11.1	85.7	3.4
1965	1,310	14.5	79.4	6.0
1968	1,890	10.8	83.6	5.4
1969	2,430	9.7	82.3	5.6
Asia[a]				
1960	1,869	40.7	54.5	3.3
1961	1,960	42.2	54.0	2.9
1964	2,755	32.8	61.2	5.0
1965	3,010	31.7	63.8	4.2
1968	4,500	26.8	69.2	3.6
1969	5,340	25.9	69.7	3.9
Latin America				
1960	670	9.1	88.1	0.1
1961	690	10.7	87.0	0.3
1964	900	20.6	78.9	0.1
1965	1,060	21.7	77.4	0.7
1968	1,660	20.5	78.9	0.5
1969	1,780	21.3	78.1	0.4

Source: UNIDO, based on United Nations, *Monthly Bulletin of Statistics*, March 1966 and March 1971.

Note: Figures do not add to the total, which includes, among others, figures for islands in the Caribbean and the Pacific.

[a] Other countries included in these statistics for the economic groupings and regions are given in the footnotes to table 17.

exports of chemicals to developing countries.[11] Otherwise, the developing countries became a relatively more important market only for Latin American exports of transport and machinery (SITC 7) and other manufactures (SITC 6 and 8). In general, greater dependence on the markets of the developed market economies was manifest.

[11] The importance of Asian and African chemical exports to the centrally planned economies also increased. For Africa the growth was particularly dramatic at the end of the decade.

The somewhat improved position of developing countries in the world market for manufactures (table 16) appears more impressive when it is considered that many of the new markets are in the developed market economies where the competition from established producers could be expected to be greatest. Further, the view might be taken that this greater market penetration means that the manufactured exports of the developing countries have become more competitive. On the other hand, it should be recognized that this increased dependence at the same time augments the degree to which developing countries are subject to vagaries in the progress of the developed market economies.

It was observed, on the basis of table 16, that the vigorous growth of developing countries' manufactured exports was important in upholding the relative position of their total exports. The data in table 21 allow further elaboration of this theme. The table indicates that, for the three developing regions as a whole, manufactured products have become a more important component of total exports. In view of the smaller base from which the developing countries began, their growth in importance as exporters of manufactures may be regarded as much more dynamic than a similar improvement in the relative position of the developed market economies. As table 22 indicates, the similar increase for total manufactures' share of exports, which appears in table 21 for both the developing countries and the developed market economies, involved an 11 per cent improvement for the developed market economies and 61 per cent for the developing countries in the First Development Decade. The pattern of growth is generally the same for each of the commodity groups, and for each group the most dynamic expansion was achieved by the developing countries. Within this context, it should be recognized that the small initial base for exports of machinery and transport equipment is a factor in the relatively impressive increase in the exports of that commodity. However, exports of other manufactures (SITC 6 and 8), which maintained the leading position among manufactured exports for developing countries, accounted for most of the improvement in the relative position of these countries' manufactured exports. For the developed market economies, exports of this commodity group continued to account for about the same percentage of total exports. Exports of other manufactures (SITC 6 and 8) from the centrally planned economies actually declined relative to total exports over the period.

In general, these data indicate that manufactured exports are becoming more important for developing countries relative to total exports. Given the assumption that manufactured products must be exported if foreign exchange earnings are to be sufficient to finance the required imports for development, the experience of the First Development Decade seems favourable. If these trends continue, more than a third of the export earnings of developing countries will be provided by manufactures by the end of the Second Development Decade. With dynamic shifts in internal resources the prospects for future growth may be much brighter (assuming no counteraction on the part of the developed countries).

The benefits from these gains have not, however, been evenly distributed among the countries of the three developing regions. A closer examination

TABLE 21. VALUE OF EXPORTS OF MANUFACTURES RELATIVE TO VALUE OF TOTAL EXPORTS, BY ECONOMIC GROUPING, 1960—1969

Commodity group (SITC)	Year	Total exports from			
		World	Developing countries	Developed market economies	Centrally planned economies
		Million dollars			
Total exports (0—9)	1960	127,400	27,350	85,040	15,020
	1961	133,090	27,650	89,900	15,720
	1964	171,940	34,350	117,220	20,340
	1965	186,390	36,490	128,180	21,730
	1968	239,140	44,409	167,670	26,900
	1969	272,710	49,780	193,190	29,750
		Manufactures as per cent of total exports			
Manufactures (5—8)	1960	54.7	14.1	67.5	56.5
	1961	55.2	14.4	67.5	57.2
	1964	57.4	16.3	68.9	61.0
	1965	58.9	17.5	70.2	61.1
	1968	62.8	22.1	74.2	59.6
	1969	64.5	23.7	75.7	60.0
Chemicals (5)	1960	5.8	1.1	7.6	4.4
	1961	5.9	1.2	7.6	4.6
	1964	6.3	1.3	8.1	4.6
	1965	6.6	1.4	8.3	5.0
	1968	7.1	1.6	8.9	4.9
	1969	7.1	1.7	8.8	4.8
Machinery and transport equipment (7)	1960	21.8	0.7	28.8	24.9
	1961	22.6	0.8	29.1	23.9
	1964	23.8	1.0	29.8	27.5
	1965	24.5	1.1	30.6	27.7
	1968	27.4	1.7	34.0	29.4
	1969	28.3	2.2	34.9	29.4
Other manufactures (6 and 8)	1960	27.1	12.3	31.8	27.2
	1961	26.6	12.4	30.7	28.6
	1964	27.3	13.8	31.0	28.9
	1965	27.8	15.0	31.3	28.3
	1968	28.3	18.8	31.3	25.4
	1969	29.1	19.9	32.0	25.9

Source: UNIDO, based on United Nations, *Monthly Bulletin of Statistics*, March issue, various years.
Note: Figures do not add to the total, which includes, among others, figures for islands in the Caribbean and the Pacific.

of the data clearly reveals that a few countries dominated the statistics for manufactured exports from the developing regions. An analysis is made below of the trade of these principal exporters of manufactured products to the developed countries.[12]

[12] In 1969, 70.6 per cent of the manufactures exported by developing countries went to developed market economies, and 25.1 per cent to other developing countries.

TABLE 22. PERCENTAGE GROWTH OF THE PROPORTION OF TOTAL EXPORTS DEVOTED TO MANUFACTURES, 1960—1969

Commodity group (SITC)	*World*	*Developing countries*	*Developed market economies*	*Centrally planned economies*
Total manufactures (5—8)	15.8	60.7	11.0	5.2
Chemicals (5).....	21.4	43.5	16.4	7.8
Machinery and transport equipment (7)	25.5	160.0	20.7	20.5
Other manufactures (6 and 8) ...	6.8	56.7	1.3	—8.1

Source: UNIDO, based on United Nations, *Monthly Bulletin of Statistics*, March issue, various years.
[a] Growth over the decade was computed as the percentage increase of the 1968—1969 average over the 1960—1961 average.

Table 23 provides an indication of the composition and extent of the concentration of manufactured exports among developing countries. The concentration is greatest for miscellaneous manufactured goods (SITC 8) and least for chemicals and basic manufactures (SITC 5 and 6). The leading countries exporting chemicals (SITC 5) are in Latin America, while for basic manufactures (SITC 6)[13] Asia is the most important region, followed by Africa (using the criterion of number of countries). From another perspective, if a country is an important exporter of basic manufactures (SITC 6), it is likely to be a leading exporter of total manufactures (SITC 5—8). Only China (Taiwan), India and Mexico rank among the most important exporters of manufactures in all commodity groups. Brazil, Hong Kong, the Republic of Korea and the three countries of Malaysia, Singapore and Brunei grouped together are the only countries that rank among the most important exporters of all but one commodity group. Thus, if judged on the basis of diversified important manufactures, the number of countries with a high ranking is quite limited.

An examination of the product concentration of the leading exporters for each commodity group provides a better understanding of the nature of this trade. Guinea, Jamaica, Mexico, Surinam, and Trinidad and Tobago were the most important exporters of chemicals among the developing countries, but their product mix differed radically. Mexican exports of chemicals were quite diversified, whereas 100 per cent of chemical exports from Guinea and Surinam, and 96 per cent from Jamaica, belonged to the aluminium oxide, hydroxide group (SITC 513.65), and 61 per cent of those from Trinidad and Tobago were in the anhydrous ammonia group (SITC 513.61).

Exports of basic manufactures (SITC 6) exhibited a similar pattern of concentration. The four leading exporters of these manufactures were Chile, India, Zaire and Zambia. For India, textile products comprised 60 per cent of these exports, while copper products predominated for Chile, Zaire and Zambia (99 per cent, 77 per cent and 70 per cent respectively). To the extent that unrefined copper is included, however, these figures are distorted. Of the three copper exporters, Zambia appears to export the least unrefined copper

[13] See table 23, footnote *b*, for definition of basic manufactures.

TABLE 23. EXPORTS OF MANUFACTURES FROM SELECTED DEVELOPING COUNTRIES TO THE DEVELOPED COUNTRIES, 1969[c]

As per cent of exports of manufactures from all developing countries to developed countries

	SITC commodity group				
	5–8 Total manufactures	*5 Chemicals*	*6 Basic manufactures*[b]	*7 Machinery and transport equipment*	*8 Miscellaneous manufactured goods*[c]
Africa					
Angola			1.09		
Ghana			1.26		
Guinea		6.36			
Kenya				1.29	
Liberia				3.46	
Madagascar		1.21			
Sierra Leone	1.06		1.63[d]		
Tunisia		1.39			
Zaire	7.39		11.47		
Zambia	11.11		16.92		
Asia					
China (Taiwan)	5.37	1.85	2.23	19.14	11.23
Hong Kong	18.36		4.37	30.86	61.40
India	7.56	2.70	10.49	2.14	1.79
Indonesia		1.30		1.07	
Iran	1.47		2.13		
Korea, Republic of	4.33		2.50	4.74	10.78
Kuwait				1.37	
Malaysia, Singapore, Brunei	4.20		5.59	2.34	1.50
Pakistan	2.31		3.25		
Philippines	1.23		1.01		2.43
Portuguese Asia					1.30
Thailand	1.17		1.66		
Latin America					
Argentina	1.02	5.53		1.72	
Bahamas		4.21			
Brazil	1.50	4.03	1.36	4.41	
Chile	9.20	1.95	13.88		
Guyana		3.22			
Jamaica		8.19			
Mexico	5.20	12.77	3.64	16.73	3.97
Netherlands Antilles		2.37			
Panama		1.92			
Peru	3.38		5.11		
Surinam		8.85			
Trinidad and Tobago		6.10			
Total	85.86	73.95[e]	89.59	89.27	94.40

Source: UNIDO, based on United Nations, Statistical Office, *1969 Supplement to the World Trade Annual: Trade of the Industrialized Nations with Eastern Europe and the Developing Nations*, 5 vols, Walker and Co., New York, 1970.

[a] Countries included in this listing exported at least 1 per cent of the exports from developing countries to developed countries for at least one of the commodity groups covered.

[b] Manufactured goods classified by materials, e.g. textiles, iron and steel, glass etc. In other tables this category has been lumped with SITC 8 and called "other manufactures".

[c] Includes clothing, scientific instruments, musical instruments, books and other printed matter etc. See *b* above.

[d] Of these, 99.9 per cent are non-industrial diamonds, unset.

[e] Chemical exports from Bermuda also appear to be substantial (10.35 per cent of the developing countries' total). However, since they are primarily re-exports, they are not considered as originating in Bermuda.

(approximately 5 per cent of the total for this product group). In general, refined copper, unwrought, seems to predominate among copper exports.[14]

Machinery and transport equipment evidenced similar product concentration. For the three leading exporters—China (Taiwan), Hong Kong and Mexico electrical equipment was predominant. And within this broad category, for all three countries, telecommunications equipment and transistors, and electrical valves were most important.

Even within the general commodity group, miscellaneous manufactured goods[15] (SITC 8), a substantial concentration may be noted. Clothing was predominant for each of the three principal exporters—China (Taiwan), Hong Kong and the Republic of Korea. Wigs and false beards accounted for most of Korea's remaining exports in this category. Wigs were also important for Hong Kong and footwear and toys and sports equipment were important for both Hong Kong and Taiwan. Together these three countries accounted for 83.41 per cent of the developing countries' exports of products in this group to developed countries.

Some of this concentration of manufactured exports is dictated by the raw material component of the exported product. In other instances (e.g. in the case of SITC groups 7 and 8), market possibilities in developed countries may have been identified and efforts then made to take advantage of them. Such experiences, with relatively new products, demonstrate the export advantage of a country's ability to shift its resources from one industry to another, as well as the benefit of identifying new market situations (e.g. for wigs).

The export performance of developing countries may also be seen by comparing the export growth of traditional and non-traditional products. For this comparison, seven commodity groups have been selected; four are assumed to be traditional and three to be non-traditional exports of developing countries. Table 24 gives the relevant data, which are somewhat misleading, however, owing to the small scale on which the new exports are undertaken. For African exports of passenger motor cars and their parts, for example, an increase from $1 million to $3 million in 1966–1967 appears as a 200 per cent increase.

The data reveal that negative changes in export growth rates occurred much less for the non-traditional exports. To judge whether or not these shifts may have been demand-induced, an analysis of developments in 1967, the year of a slowdown in trade growth, is informative. In that year growth rates for exports of traditional products from developing countries to developed market economies, the three developing regions and the centrally planned economies declined in 40 per cent of the cases for these commodity groups (table 24), while non-traditional export growth rates declined in only one-ninth of the cases. This indicates that from the standpoint of demand the prospects

[14] The word "seems" is used because the nature of Zaire's copper exports to Belgium-Luxembourg cannot be ascertained from the United Nations data. Refined copper predominates among its exports to other countries.

[15] See table 23 for definition.

TABLE 24. ANNUAL GROWTH RATES OF SELECTED EXPORTS FROM THE DEVELOPING COUNTRIES TO THE RESPECTIVE ECONOMIC GROUPINGS, AND TO AFRICA, ASIA AND LATIN AMERICA, 1966—1969

(Per cent)

Commodity group (SITC)	Year	Exports to					
		Developed market economies	Centrally planned economies	Developing countries	Africa	Asia	Latin America
Traditional exports							
Animal and vegetable oils and fats (4)	1965—1966	—4.1	—18.5	26.3	—18.2	—5.7	145.5
	1966—1967	—8.6	—27.3	—16.0	—27.8	8.0	—29.6
	1967—1968	11.8	112.5	0.0	15.4	—5.6	5.3
	1968—1969	—1.1	—11.8	52.4	46.7	72.5	25.0
Textile fibres (26)	1965—1966	3.7	2.9	10.5	—27.3	20.8	—3.5
	1966—1967	—12.1	—15.5	—22.2	37.5	—28.7	—12.7
	1967—1968	3.3	—1.7	18.4	9.1	21.3	12.5
	1968—1969	4.7	22.0	8.6	0.0	8.5	13.0
Crude fertilizers and minerals (27)	1965—1966	—5.7	—21.7	7.1	—22.2	—3.8	—25.0
	1966—1967	0.0	33.3	—6.7	28.6	8.0	0.0
	1967—1968	12.1	4.2	—16.1	—22.2	—14.8	33.3
	1968—1969	—8.1	16.0	4.3	—14.3	8.7	37.5

Textile yarn and fabrics (65)	1965—1966	5.8	0.0	—4.0	6.9	—4.7	—21.1
	1966—1967	1.4	7.1	14.6	—3.2	25.3	0.0
	1967—1968	10.8	—6.7	5.5	0.0	13.8	—25.0
	1968—1969	9.8	14.3	10.3	13.3	5.9	52.4
Non-traditional exports							
Iron and steel (67)	1965—1966	3.8	0.0	—8.0	57.1	5.7	—39.6
	1966—1967	52.4	400.0	8.7	27.3	—2.7	34.5
	1967—1968	24.0	180.0	16.0	28.6	25.0	—10.3
	1968—1969	6.5	14.3	24.1	11.1	17.8	54.3
Manufactures of metal (69)	1965—1966	15.4	0.0	—1.4	—36.8	7.7	45.5
	1966—1967	—6.7	200.0	0.0	25.0	—11.9	6.3
	1967—1968	35.7	133.3	30.0	13.3	56.8	—23.5
	1968—1969	17.5	57.1	20.9	17.6	12.1	76.9
Passenger motor cars and their parts (732)	1965—1966	0.0	—	—30.0	—75.0	—68.4	—
	1966—1967	0.0	—	0.0	200.0	—10.5	—
	1967—1968	0.0	—	28.6	0.0	41.2	—
	1968—1969	100.0	—	22.2	66.7	16.7	—

Source: UNIDO, based on United Nations, *Monthly Bulletin of Statistics*, May 1971.

for expansion of developing countries' trade are much brighter in non-traditional exports. This phenomenon, together with the growing importance of manufactured exports relative to total exports, implies that if external pressures should limit export expansion, the growth of traditional exports would be slowed first and perhaps to a greater extent. A possible explanation of this phenomenon is that slowing growth rates may reflect volume and/or price changes. For example, a decline in prices of traditional exports could partially offset increases in volume, and thus be registered as a decline in growth rate.

In general, with regard to the export of manufactures, the experience of the developing countries was relatively favourable in the First Development Decade, and it has done much to offset the deteriorating export position of primary products. But the link between exports and development, which receives so much attention, is only one aspect of the picture. The other important component—the import of manufactures which often results from rapid growth—is examined below.

Growth of manufactured imports

As with total exports, the total imports of developing countries increased substantially during the First Development Decade (exports by 82 per cent and imports by 81.75 per cent). The growth of imports was not uniform, however, among developing countries. African imports increased 28 per cent during the First Development Decade, while Asian and Latin American imports expanded 167 and 70 per cent respectively.[16] Imports of manufactures to the developing countries and to each of the developing regions increased relative to total imports over the decade. The largest growth took place in Asia; the figures for Asia raised substantially the over-all average for the developing regions.

The ratio of manufactured imports to total imports might be considered to be within the range expected. For the developing countries in 1969, imports of manufactures accounted for 69.2 per cent of total imports, whereas for the developed countries manufactured imports comprised 62.8 per cent in the same year. The precise reason for growth in the importance of manufactured imports for the developing countries is not, however, easily determined. *A priori* it would seem logical that developing countries should achieve greater self-sufficiency in other manufactures (SITC 6 and 8) as development progresses. Further, until a high degree of industrialization is reached, imports of machinery and transport equipment and possibly chemicals might be expected to increase relative to total imports. The data in table 25 appear to support this supposition. For all developing regions, imports of chemicals (SITC 5) increased from 7.7 per cent to 9 per cent of total imports; and for machinery and transport equipment (SITC 7), from 28.2 to 33.6 per cent over the period 1960—1969. Similar patterns are evident for the imports of each of the developing regions. But for other manufactures (SITC 6 and 8) a decrease of from 28.4 to 26.7 per cent of total

[16] The data indicate that in recent years African imports have been increasing rapidly. Hence, this estimate may not accurately reflect current tendencies.

TABLE 25. WORLD EXPORTS OF MANUFACTURES RELATIVE TO TOTAL EXPORTS TO DEVELOPING COUNTRIES, 1960—1969

Commodity group (SITC)	Year	Total exports to[a]			
		Developing countries (total)	Africa[b]	Asia	Latin America
		Million dollars			
Total exports (0—9)	1960	28,430[b]	7,830	9,190	7,820
	1961	29,350[b]	7,750	9,550	8,080
	1964	35,240	7,390	16,090	9,160
	1965	37,580	8,170	17,340	9,320
	1968	46,280	8,920	21,850	12,160
	1969	51,690	10,040	24,560	13,290
		Manufactures as per cent of total exports			
Manufactures (5—8)	1960	64.4[b]	70.6	59.1	73.5
	1961	65.1[b]	68.7	61.9	75.0
	1964	64.0	68.9	61.1	71.0
	1965	66.0	72.0	63.0	73.0
	1968	68.2	73.1	65.7	74.9
	1969	69.2	73.8	66.4	76.5
Chemicals (5)	1960	7.7[b]	6.9	7.7	10.1
	1961	8.1[b]	7.4	8.3	10.5
	1964	8.3	7.0	7.3	11.7
	1965	8.5	7.6	7.7	11.7
	1968	9.4	8.5	8.7	12.3
	1969	9.0	8.4	8.2	11.7
Machinery and transport equipment (7)	1960	28.2[b]	30.1	22.7	38.4
	1961	29.2[b]	28.8	24.7	39.9
	1964	29.0	30.7	26.4	36.0
	1965	30.5	34.0	27.8	36.6
	1968	32.6	35.1	29.2	40.7
	1969	33.6	36.4	30.3	41.4
Other manufactures (6 and 8)	1960	28.4[b]	33.6	28.6	25.1
	1961	27.8[b]	32.5	28.9	24.6
	1964	26.7	31.1	27.5	23.4
	1965	27.0	30.4	27.5	24.7
	1968	26.1	29.5	27.8	22.0
	1969	26.7	29.1	28.0	23.4

Source: UNIDO, based on United Nations, *Monthly Bulletin of Statistics*, March issue, various years.
Note: Figures do not add to the total, which includes, among others, figures for islands in the Caribbean and the Pacific.
[a] Import data are taken from the "exports to" columns for world trade by commodity classes and regions, United Nations, *Monthly Bulletin of Statistics*. They are therefore recorded as f.o.b.
[b] South Africa is included for the years 1960 and 1961.

imports occurred for all developing countries; and from 33.6 to 29.1 per cent for Africa, 28.6 to 28 per cent for Asia, and 25.1 to 23.4 per cent for Latin America.

From this it may be concluded that the composition of imports of the developing regions has been changing in keeping with *a priori* expectations. The changes are also an indication that industrialization is expanding in these regions. As with exports, the data are strongly affected by the performance

TABLE 26. PER CAPITA IMPORTS TO DEVELOPING COUNTRIES, 1969
(Dollars)

Importing region	*SITC commodity group*					
	5	*6*	*7*	*8*	*5–8*	*0–9*
Africa	2.78	6.64	13.75	2.10	25.27	29.59
Latin America	8.36	11.53	29.92	4.79	54.59	69.47
Asia	0.80	1.84	3.02	0.50	6.16	7.92
Developing countries	1.61	1.39	6.41	1.02	10.43	15.29

Sources: UNIDO, based on United Nations, Statistical Office, *1969 Supplement to the World Trade Annual*, 5 vols, Walker and Co., New York, 1970; UNCTAD, unpublished data on imports; United Nations, *Statistical Yearbook, 1970* (Sales No.: 71.XVII.1) [population data].

of the largest developing countries. Thus, what is true for the aggregate does not necessarily hold for individual countries. Space does not allow a country-by-country analysis here. However, these general observations may serve as useful bench-marks with which the data for individual countries may be compared.

Another useful point of reference in measuring development is the performance of *per capita* imports for manufactured products. By referral to *per capita* figures, the size of country does not influence the evaluation of import performance. As indicated in table 25, imports of manufactures increased (although imports of the commodity group SITC 6 and 8 declined) relative to total imports over the first nine years of the First Development Decade. Thus, given the probability that capital equipment, chemicals etc. may have to be imported in order to attain development goals, future estimates may be expected to reflect an increase in *per capita* imports of chemicals and machinery and transport equipment.

Table 26 indicates that the highest *per capita* importation of total manufactures occurred in Latin America and this figure was strongly influenced by the sizable imports of machinery and transport equipment. For chemicals, Latin America also had the highest *per capita* imports. As industrialization moves ahead in Africa and becomes more diversified in Asia, the *per capita* imports of products in these two categories may be expected to rise. The low *per capita* imports of other manufactures (SITC 6 and 8) to Asia should be noted. As the predominance of Asia as an exporter of these products is an indication of local production capacity, its relatively few imports may be taken as an indication of its greater self-sufficiency in these products.[17] As development proceeds in the other developing regions, especially if undertaken within the framework of regional economic co-operation, *per capita* imports of these commodities may decline or increase more slowly than before.

GENERALIZED PREFERENCES

At various times in the past the developed countries have been requested to grant unilateral import preferences for the products of developing countries.

[17] A major problem that arises when comparisons of production and trade performances are attempted by commodity is that output of manufactures is classified according to ISIC while exports of manufactures are classified according to SITC.

The focus has generally been on the need for the developed countries to eliminate tariffs on products from developing countries without reciprocity on the part of developing countries. The call for such preferences was institutionalized in March 1968 when the United Nations Conference on Trade and Development (UNCTAD) established by virtue of Resolution 21 (II) the Special Committee on Preferences. Subsequently, at its third session in July 1969, the Special Committee adopted procedures whereby the developed market economies were to exchange views within the framework of the Organisation for Economic Co-operation and Development (OECD) on the extension of generalized preferences, with the aim of (1) determining the feasibility of extending generalized preferences and (2), if found feasible, developing national proposals for the extension of such preferences. Eighteen countries agreed to grant generalized preferences.[18]

These countries prepared two lists; the first specified products included in the Brussels Tariff Nomenclature (BTN) chapters 25—99 on which preferences would not be extended, and the second listed products covered by BTN chapters 1—24 on which preferences would be extended. Products covered by chapters 25—99 primarily include manufactures, while chapters 1—24 encompass primary products, both unprocessed and processed. The preferences, which have either been proposed or granted, are considered to be temporary (first stage—10 years) and non-binding by the donor countries. This means that at some time in the future they will be reviewed in general, and in the meantime may be withdrawn or extended to other countries. Short of complete withdrawal, most donor countries in principle retain the right to limit the application of the preferences if this seems necessary. The various positions are based on the assumption, which seems realistic, that the most favoured-nation treatment will be waivered only within the framework established by the General Agreement on Tariffs and Trade (GATT).

The EEC, Japan, the Nordic countries, the United Kingdom and the United States envisage the establishment of a list of duty-free imports of most products classified in chapters 25—99 of the BTN. The Nordic countries, the United Kingdom (except in a few cases) and the United States also propose duty-free entry of most products in BTN chapters 1—24. For the latter category, the EEC is not eliminating tariffs, however, owing to its special preferences favouring its associated overseas countries. In general, it might be assumed that many of the manufactured products in BTN chapters 1—24 would be of particular interest to the least developed of the developing countries. For this reason, it

[18] Austria, Canada, the European Economic Community (EEC—Belgium, France, Federal Republic of Germany, Italy, Luxembourg and the Netherlands), Denmark, Finland, Ireland, Japan, New Zealand, Norway, Sweden, Switzerland, the United Kingdom and the United States. (Denmark, Finland, Norway and Sweden have made a joint offer, which is referred to as the offer of the Nordic countries).

In addition to OECD countries, Bulgaria, Czechoslovakia, Hungary, Poland and the USSR have expressed support for generalized preferences in principle. Since some of these countries do not have tariffs, and because they favour a broader approach, they are currently examining possible ways of implementing their support.

would be beneficial if the concessions of the developed market economies, especially for products in these chapters, were to be increased.

In keeping with its general mandate, UNIDO has undertaken and will continue to undertake measures appropriate to assisting the developing countries in exploiting the opportunities created by the generalized preference schemes as they are implemented. In particular, the UNIDO Industrial Survey Missions and programming and planning assistance will consider the potential effects of generalized preferences whenever appropriate. Further, the *Industrial Development Survey* will periodically monitor the global effects of generalized preferences on the industrialization of developing countries as the Second Development Decade progresses.

The review in this chapter, and those contained in the *Industrial Development Survey*, Vols I, II and III, of the export performance of manufactures generally apply for products in BTN chapters 25—99. It is recognized that a few major developing countries dominate the export trade in products covered by these chapters. To evaluate the potential for exports of manufactures by the least developed countries, attention is focused in table 27 on those primary products that have undergone some degree of processing in the manufacturing sector but that are recorded in the trade statistics within the category primary products (SITC 0—4). These products are referred to hereafter as processed primary products. Since many of the least developed of the developing countries may expand production of these products in the initial phase of development, this table provides a bench-mark with which individual countries may evaluate their performance and against which future performance may be measured.

As table 27 indicates, manufactured exports of food and live animals (recorded in SITC 0) are presently most important, and exports of processed mineral fuels etc. (recorded in SITC 3) rank second. This same situation holds for Africa and Latin America. For Asia, however, partly refined petroleum products predominate. Further, it may be noted that within each of the commodity groups included in SITC 1—4, the processed products that are leading exports do not vary greatly among the three regions. (There are some notable exceptions to this, i.e. copra (SITC 221.2) exports from Asia have been very important.) Within the commodity group of food and live animals, however, there is substantial variation in importance from region to region. For Africa, vegetable oil residues (SITC 081.3) and cocoa butter and paste (SITC 072.3) are most important. For Latin America, meat and meat preparations (SITC 01) and refined sugar (061.2) are predominant. And processed shellfish (031.3), refined sugar (061.2) and preserved fruit (052) dominate this group of commodities exported from Asia.

On the assumption that current exports are an indication of the potential expansion of exports of processed primary products, Latin America would be the region likely to suffer most if some developed countries or regions do not eliminate import tariffs completely on these products. If fuels are excluded, which are natural resources of a few countries and often subject to separate, private agreements, Asia would rank second as a potential loser.

These same data, when presented on a country basis, are often used to demonstrate that some areas (often selected African countries are singled out) are at present less developed than others.[19] Further, it is argued that the least developed countries are unable to compete with the more developed and are therefore in need of special, non-generalized preferences. Whether or not this contention is justified has yet to be fully debated. On the one hand, it seems a logical extension of the idea promoted by UNCTAD of centre-periphery relationships.[20] On the other hand, a more direct approach (i.e. increased production-oriented aid) might seem preferable as a method of assisting the least developed of the developing countries.

The data may be examined in yet another way, by comparing the exports of processed primary products with manufactured exports (SITC 5—8), by developing region. Discounting mineral fuels etc. (SITC 3), table 27 indicates that, in 1969, Latin American exports of processed primary products equalled 114 per cent of that region's manufactured exports. Similar percentages for Africa and Asia were 59 and 30 respectively. Thus, Asia, which is relatively important in the export of SITC 5—8 products, will conceivably be most favoured by the extension of generalized preferences. This region is both aggressive and accomplished in the production of those products most broadly included in these schemes. By contrast, further evidence is available that Latin American exports are most discriminated against by those economic groupings or countries that refuse to liberalize completely the preferences extended for processed primary products.

By examining exports of mineral fuels only, some implications regarding the aims and success of government policy become apparent. Assuming that for domestic development it is desirable to export products containing the greatest possible value added (within the general constraints imposed by efficiency), one goal of developing countries might be to encourage domestic processing. An examination of exports of mineral fuels, by developing region, reveals that 56.2 per cent of Latin American exports in this commodity group have undergone some processing. In contrast only 0.8 per cent of African and 9.1 per cent of Asian exports of manufactures take this form. These figures appear to indicate that Latin America followed by South and South-east Asia have been most successful in encouraging domestic processing. If such encouragement is, in fact, a policy goal, these experiences may provide standards in evaluating the relative success in attaining these goals.

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[19] Thus, the small volume of exports is regarded as an indication of untapped capability. And a large volume of this type of export may be regarded as an indication that future dynamic export expansion is unlikely.

[20] Within this well-known analytical framework the centre represents the currently industrialized countries and the periphery the developing countries. For various reasons production and trade flows involve specialization in primary products by the periphery and in manufactured goods by the centre. On this basis, it could be argued that the more developed among the developing countries would continue the process of industrialization, and the least developed would continue to produce primary products for export. Thus, the least developed countries might become related economically to the more developed of the region in much the same way that developing countries in general are related to the developed market economies.

TABLE 27. IMPORTS OF PROCESSED PRIMARY PRODUCTS WITHIN SITC 0—4 TO DEVELOPED MARKET ECONOMIES FROM DEVELOPING COUNTRIES, 1969

(Thousand dollars)

Commodity	SITC	Imports from			
		Africa	Latin America	Asia	Developing countries
Food and live animals	0				
Meat and meat preparations	01	23,472	656,681	13,694	693,847
Milk and cream, evaporated or condensed	022.1	58	35	—	93
Milk and cream, dry	022.2	100	—	—	100
Butter	023	287	2,606	—	2,893
Cheese and curd	024	12	3,750	485	4,247
Fish, fresh, chilled or frozen	031.1	8,378	18,774	46,668	73,820
Fish, salted, dried or smoked	031.2	975	359	768	2,102
Shellfish, fresh, chilled, frozen etc.	031.3	14,192	177,514	120,654	312,360
Fish, tinned, and fish preparations	032	24,915	17,976	18,102	60,993
Rice, glazed or polished	042.2	13,891	6,903	15,990	36,784
Meal and flour of wheat or meslin	046	435	—	53	488
Flour and cereal preparations etc.	048	647	400	2,018	3,065
Dried fruit	052	1,608	2,700	15,351	19,659
Fruit, preserved, prepared	053	27,894	60,933	92,884	181,711
Vegetables, frozen or preserved	054.6	2,651	99	969	3,719
Vegetables, roots and tubers etc.	055	20,572	8,506	89,575	118,653
Refined sugar etc.	061.2	11,699	377,721	135,614	525,034
Molasses	061.5	10,237	48,587	24,458	83,282
Sugar, confectionery	062	130	779	1,261	2,170
Coffee essences, extracts	071.3	1,095	37,031	154	38,280
Cocoa powder, unsweetened	072.2	3,498	2,598	—	6,096
Cocoa butter and paste	072.3	90,493	24,312	920	115,725
Chocolate and other chocolate products	073	3,498	453	359	4,310
Bran, pollard, sharps etc.	081.2	18,123	43,153	8,728	69,974
Vegetable oil residues	081.3	93,371	146,137	70,123	309,631
Meat and fishmeal (fodder)	081.4	14,416	217,956	1,442	233,814
Miscellaneous food preparations	09	2,493	6,400	8,835	17,728
Total		389,140	1,862,363	669,105	2,920,578
Beverages and tobacco	1				
Non-alcoholic beverages, n.e.s.	111	93	31	—	124
Alcoholic beverages	112	111,584	36,452	5,686	153,722
Tobacco manufactures	122	974	9,689	3,628	14,291
Total		112,651	46,172	9,314	168,137
Crude materials, inedible, except fuels	2				
Hides, skins, fur skins, undressed	21	69,614	134,082	99,189	302,885
Copra, excluding flour and meal	221.2	11,386	329	143,848	155,563
Wood charcoal	241.2	7	246	1,135	1,388
Wood, shaped or simply worked	243	59,404	76,536	146,508	282,448
Pulp and waste paper	25	12,706	1,559	2,755	17,020
Sheep's and lamb's wool, degreased	262.2	94	34,174	7,213	41,481
Wool or other animal hair etc.	262.7	30	5,861	—	5,891
Synthetic, regenerated fibre	266	0	99	1,142	1,241

TABLE 27 *(continued)*

Commodity	*SITC*	*Imports from*			
		Africa	*Latin America*	*Asia*	*Developing countries*
Building and dimension stone etc. .	273.1	811	2,011	2,765	5,587
Copper matte	283.12	984	22,384	8,599	31,967
Nickle matte, speiss etc.....	283.22	6	11,637	—	11,643
Total		155,042	288,918	413,154	857,114
Mineral fuels, lubricants and related materials.....	3				
Coke and semi-coke of coal etc....	321.8	222	—	239	461
Petroleum, partly refined.....	331.02	281	134,430	239,194	373,905
Petroleum products	332	28,124	1,261,576	445,584	1,735,284
Total		28,627	1,396,006	685,017	2,109.650
Animal and vegetable oils and fats	4				
Animal oils and fats	41	1,457	34,577	260	36,294
Fixed vegetable oils and fats	42	170,364	96,243	145,944	412,551
Processed animal and vegetable oils etc.	43	4,418	13,522	417	18,357
Total		176,239	144,342	146,621	467,202
Grand totals for processed primary products (SITC 0—4) and for manufactured products (SITC 5—8)					
Processed primary products.....		861,699	3,737,801	1,923,211	6,522,681
Manufactured products		2,178,247	2,113,747	4,061,362	8,353,356

Source: UNIDO, based on United Nations, Statistical Office, *1969 Supplement to the World Trade Annual*, 5 vols, Walker and Co., New York, 1970.

ECONOMIC INTEGRATION IN DEVELOPING COUNTRIES

The principal developments and major problems of regional integration of developing countries were briefly analysed in Volume I of the *Industrial Development Survey*.[21] In Volume II of the *Survey* this analysis was considerably expanded;[22] institutional analyses were updated and the effects on economic structure of regional integration were examined. Thus, it would serve little purpose to extend these earlier studies here. Instead, an attempt is made to evaluate the effectiveness of regional integration in promoting industrialization.

Basic to the present, as well as earlier, considerations of this matter is the assumption that the larger market resulting from the regional integration of developing countries will facilitate the process of industrialization. Industrial capacity could be developed on an efficient scale if duplication of investments among countries could be avoided. Thus, an important manifestation of the effectiveness of regional economic integration should be increased intra-regional trade in manufactures. Trade in manufactures is emphasized for several reasons. First, primary commodities are often excluded from coverage by regional integration schemes. Second, in developing countries, successful integration implies new, unduplicated industrial investment. If such transpires, increased

[21] UNIDO, *Industrial Development Survey*, Vol. I (Sales No.: 68.II.B.18), pp. 140—151.

[22] UNIDO, *Industrial Development Survey*, Vol. II (Sales No.: 70.II.B.5), chapter V.

TABLE 28. EXPORTS OF MANUFACTURES TO LATIN AMERICA FROM THE RESPECTIVE ECONOMIC GROUPINGS, AND INTRA-LATIN AMERICAN EXPORTS, 1960—1969

(Million dollars)

Commodity group (SITC)	*Year*	*Exports from*				
		World	*Developed market economies*[a]	*Centrally planned economies*[b]	*Developing countries*[c] *(total)*	*Latin America*[d]
Chemicals (5)	1960	790	740	28	22	15
	1961	850	770	25	50	12
	1962	860	790	35	37	19
	1963	890	800	47	36	33
	1964	1,070	960	69	38	49
	1965	1,090	970	70	52	57
	1966	1,270	1,130	85	53	76
	1967	1,280	1,140	94	57	85
	1968	1,490	1,320	120	54	105
	1969	1,560	1,370	135	53	120
Machinery and transport equipment (7)	1960	3,000	2,930	8	65	6
	1961	3,220	3,050	13	165	10
	1962	3,160	2,970	18	175	15
	1963	2,970	2,720	29	226	25
	1964	3,280	2,990	43	251	39
	1965	3,410	3,150	52	207	50
	1966	3,890	3,570	70	253	65
	1967	4,120	3,740	77	297	70
	1968	4,950	4,510	100	349	92
	1969	5,500	5,000	135	370	125
Other manufactures (6 and 8)	1960	1,960	1,780	125	57	50
	1961	1,990	1,760	130	185	56
	1962	1,930	1,600	155	179	82
	1963	1,870	1,530	185	156	115
	1964	2,160	1,760	245	151	175
	1965	2,300	1,840	295	166	220
	1966	2,500	2,030	295	173	230
	1967	2,460	1,950	325	177	265
	1968	2,670	2,090	390	185	325
	1969	3,110	2,450	455	202	365
Total manufactures (5—8)	1960	5,750	5,450	161	144	71
	1961	6,060	5,580	168	400	78
	1962	5,950	5,360	208	391	116
	1963	5,730	5,050	261	418	173
	1964	6,510	5,710	357	440	263
	1965	6,800	5,960	417	425	327
	1966	7,660	6,730	450	479	371
	1967	7,860	6,830	496	531	420
	1968	9,110	7,920	610	588	522
	1969	10,170	8,820	725	625	610

Source: UNIDO, based on United Nations, *Monthly Bulletin of Statistics*, March issue, various years.

Note: Figures do not add to the total, which includes, among others, figures for islands in the Caribbean and the Pacific.

[a] Turkey and Yugoslavia are included in the years 1965—1969. In all years Israel is excluded.

[b] USSR, Eastern Europe, and Asian centrally planned economies.

[c] Includes Israel, Latin America and, for 1960—1964, South Africa.

[d] Included in the data for developing countries as a whole.

industrial interdependence must follow: that is, intra-regional trade in manufactures must increase.

Earlier in this study it was pointed out that in the trade of developing countries only Latin American exports of manufactures became increasingly dependent on other developing countries as a market for exports. This phenomenon coincided with the continued implementation of the Latin American Free Trade Association (LAFTA) and the Central American Common Market (CACM). Hence, it seemed desirable to investigate it further. Table 28 provides the basis for this investigation, by indicating the source of manufactured imports to Latin America.

Seen from this perspective, the ability of Latin American exports of manufactures to compete in Latin America may be evaluated. The table indicates that exports from developing countries to Latin America increased much more rapidly than did exports from the developed countries. Thus, even though the developed countries increased their exports of manufactures to Latin America in absolute terms several times more than the developing countries, over the first decade of Latin American economic integration the percentage increase of developing countries' exports to Latin America is much greater: 350.3 per cent as opposed to 61.8 per cent for the developed countries. Further analysis reveals that intra-Latin American exports of manufactures increased from 44.8 per cent of the developing countries' exports to Latin America in 1960 to 84.1 per cent in 1969. Stated differently, intra-Latin American trade in manufactures increased 759.2 per cent in 1960–1969. Considering that these relative changes occurred in a region that was a rapidly expanding import market, the new economic relationship among Latin American countries is clear. Although it is impossible to identify specifically the contribution of the economic integration process to these changes, the generally favourable effects of these efforts at co-operation cannot be denied.

In summary, although official political and legal progress in the economic integration endeavours has lagged, it would be difficult to argue that economic integration in Latin America has been ineffective. The data indicate that new commercial contacts have been made which may forge new links among the economies involved. Thus, in some cases, the practical effects of integration efforts may lead to their formal institution; that is, after commercial interests have recognized that they may gain by working together, they may encourage closer official co-operation.[23]

[23] It is often administratively and financially easier for international corporations to allocate new capacity among integrating countries than it is for an investor beginning from a base of one of the member countries. If a primary domestic goal is the encouragement of indigenous entrepreneurship, however, excessive penetration of domestic markets by international corporations may interfere with the full attainment of this goal. Thus, within the context of regional economic integration, supplemental policies and programmes to encourage domestic entrepreneurial development might be very useful.

NON-TARIFF DISTORTIONS

In view of the likelihood that generalized preferences will be implemented in the near future by most developed market economies,[24] it is important to consider the effects of non-tariff distortions (NTDs) on the trade of developing countries.[25] These practices, which consist of quotas, subsidies, health standards, customs classifications etc., may discriminate against the exports of developing countries in general, or they may artificially encourage exports from certain regions or countries. Further, most of this sort of practice still in use is not the result of deliberate policy implementation but rather the legacy of past colonial relationships. The French Franc Zone and the British Commonwealth were the most prominent examples of such relationships over the past quarter century. For a variety of reasons, those developing countries that were not a party to these "associations" were discriminated against by comparison with those that were.

The former colonizing countries generally recognize the possible adverse effects that could result from the too rapid removal of preferences that have fostered uneconomic production in the past. In such instances, specialized preferences may be granted. Optimally, these preferences should be designed so that they automatically phase out over a transition period. Thus, the major distortion problem facing developing countries would involve those non-tariff distortions that discriminate against the exports of developing countries in general.

Recent studies have pointed out that NTDs discriminating against exports are particularly burdensome to developing countries.[26] In general, means of combating NTD discrimination (e.g. legal talent) are more limited in these countries than in the case of the developed countries. Further, the resources that remain unemployed as a result of NTD discrimination have fewer alternative uses in developing countries. Finally, continued implementation of NTDs may prove a serious impediment to industrial exports and therefore tend to offset the gains expected from the introduction of generalized preferences. This possibility is supported by the fact that at the present time NTDs seem to apply most to the exports of developing countries. Surveys indicate that 28 per cent of total imports to developed market economies were subject to NTDs.[27] The magnitude of this percentage is influenced by the fact that 33 per cent of the imports of these countries from developing countries are liable to this sort of discrimination. This figure does not indicate the intensity of application of

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[24] EEC and Japan put these schemes into effect on 1 July 1971, and at the time of this writing a bill had been introduced in the United States Congress to authorize the implementation of generalized preferences.

[25] UNCTAD has done considerable work in classifying, defining and describing the probable effects of NTDs. See UNCTAD publication Nos: TD/B/C.2/83, *An Analysis of Existing Quantitative and Other Import Restrictions in Selected Developed Market Economy Countries as Products of Export Interest to Developing Countries*; TD/B/C.2/R.1 and Add. 1; and TD/B/C.2/R.2.

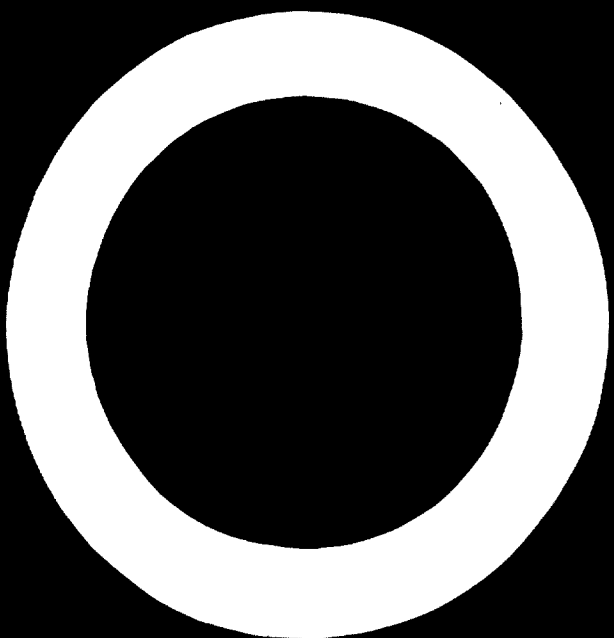
[26] Ingo Walter, "Non-Tariff Barriers and the Export Performance of Developing Countries", *The American Economic Review*, Vol. LXI, No. 2 (May 1971), pp. 195—205.

[27] *Ibid.*

NTDs although it may be assumed that if a Government enacts an NTD, it will attempt to make it effective.

In addition, there is scope for general efforts to analyse changes in NTD incidence. From one viewpoint, it seems very unlikely that NTDs will be reduced except in the more general context of trade liberalization (i.e. tariff reductions).[28] At the same time, the possibility of increases in discriminatory practices always exists. (The uncertainty created by this continuing threat can, in itself, be considered an NTD.) Since developing countries generally lack the resources to assess the effects and scope of NTD incidence, international organizations might well provide the necessary assistance in evaluating the impact of NTDs, as an aid to new industrialization.

[28] Some developed countries claim that the effect of NTD incidence on developing countries is insignificant. As evidence they cite the lack of complaints. In view of the inability of these countries to defend their interests, owing to the lack of trained legal or administrative personnel, it is likely that if NTDs are reduced, they will be reduced primarily on products preferred by the developed countries.



Chapter III

EMPLOYMENT IN MANUFACTURING IN THE FIRST AND SECOND DEVELOPMENT DECADES

The first part of this chapter reviews the development of manufacturing employment in various regions and economic groupings and in various industries since 1955. Special emphasis is placed on the developing countries in the First Development Decade. Following this review, the discussion turns to an analysis of certain major policy questions related to manufacturing employment in the Second Development Decade. The chapter closes with an account of the treatment of employment in the international development effort planned for this decade.

Trends in manufacturing employment in the First Development Decade

For the decade of the 1950s the manufacturing industries of developing countries were credited with a compound growth rate for output of about 7 per cent per annum and for employment of about 4 per cent per annum.[29] The comparative figures for the First Development Decade are not yet available. Data for the period 1960–1968, however, indicate slightly lower compound growth rates of 6.2 per cent for output and 3.4 per cent for employment (see table 29). This evidence of a long-run slackening of industrial development, especially in the second half of the 1960s, is supported by the data for the shorter interim periods.

For example, the average annual rate of growth of manufacturing output seems to have diminished gradually in the last three five-year periods in all developing regions: in Asia from 8.2 per cent in the period 1955–1960 to 7.7 per cent in the subsequent five years, and to 6.3 per cent in the years 1965–1969; for Latin America the corresponding figures are 6.2, 5.9 and 5.5 per cent; for all the developing regions together the rates are 7.2, 6.8 and 5.8 per cent.

These aggregate figures indicating trends in output have implications for employment in developing countries. In particular the reduced rates of growth of manufacturing output imply a slower rise in demand for new manufacturing labour. Indeed, the growth of such employment—as recorded in the United

[29] See UNIDO, *Industrial Development Survey*, Vol. I, pp. 2 and 231.

TABLE 29. GROWTH OF EMPLOYMENT IN MANUFACTURING, BY ECONOMIC GROUPING, 1955—1969
Average annual rate based on index numbers
(Per cent)

	1955–1960	1960–1965	1965–1969	1960–1969
Developing countries	4.3	4.3	2.1[a]	3.4[b]
Latin America	2.9	1.8	4.4[a]	2.8[b]
Asia	4.4	4.6	1.5[a]	3.4[b]
Africa	...	...	...	...
Developed market economies	2.0	2.0	1.4	1.8
Centrally planned economies	3.8	3.8	3.5	3.7
World, excluding centrally planned economies	2.6	2.9	1.5[a]	2.4[b]
World total	2.9	3.1	2.2[a]	2.7[b]

Source: UNIDO, based on United Nations, *Statistical Yearbook*, and additional data supplied by the United Nations Statistical Office.
[a] 1965–1968.
[b] 1960–1968.

Nations employment statistics—appears to have dropped from 4.3 per cent per annum in the periods 1955—1960 and 1960—1965 to 2.1 per cent in the years 1965—1968 (see table 29). For the nine-year period of the 1960s, manufacturing employment in developing countries expanded at an average annual rate of 3.4 per cent. Table 29 shows that the rates of expansion in the industrially more advanced economic groupings were even lower in general than in the developing regions. In the developed market economies, growth in manufacturing employment (averaging 1.8 per cent in the 1960s) was consistently slower than in the developing regions, and except for the latest sub-period growth was also somewhat slower in the centrally planned economies, even though these achieved a steady progress. Through the influence of this final sub-period, the centrally planned economies registered a higher rate of employment expansion (3.7 per cent) for the nine years of the 1960s. In viewing these data, however, it must be remembered that most of the countries of the industrially more advanced economic groupings have passed into a phase of development in which the share of manufacturing in total employment is no longer growing rapidly, so that manufacturing no longer plays such an important direct role in the creation of employment as it did in earlier phases of development.

Table 30 presents the year-to-year growth rates of manufacturing employment in the major economic groupings for the latest four years for which data are available. As in the longer periods dealt with in table 29, table 30 also shows great fluctuations in the rates for the developing regions and for the developed market economies. Only the centrally planned economies appear to have expanded their manufacturing sectors at a rate consistent with a rapid and relatively steady growth of employment. Table 30 indicates that the growth of manufacturing employment in Latin America in the period 1965—1968, as shown in table 29, was characterized by a steadily falling rate of expansion from year to year.

Some rates of manufacturing employment growth recorded in developing countries were lower than those of other sectors (see table 31). This should be considered in relation with the situation prevailing in these countries. In particular,

TABLE 30. GROWTH OF EMPLOYMENT IN MANUFACTURING, BY ECONOMIC GROUPING, 1965—1969
Average annual rate based on index numbers
(Per cent)

	1966	1967	1968	1969	1965–1969
Developing countries	1.8	3.6	0.9	...	2.1[a]
Latin America	6.5	4.4	2.5	...	4.4[a]
Asia	0.9	2.7	0.9	...	1.5[a]
Africa	...	...	...	...	...
Developed market economies	2.9	—0.9	0.9	2.8	1.4
Centrally planned economies	4.7	3.6	3.4	2.5	3.5
World, excluding centrally planned economies	2.8	0.9	0.9	...	1.5[a]
World total	2.8	1.8	1.8	...	2.2[a]

Source: UNIDO, based on United Nations, *Statistical Yearbook*, and additional data supplied by the United Nations Statistical Office.
[a] 1965–1968.

population and labour force in most of these countries are growing much faster than in the more advanced regions. As a result, there is in many developing countries a widespread and growing unemployment (frequently exceeding 10 per cent of the labour force) and great pressure for jobs in industry and elsewhere.[30] There are evident grounds to fear that the acceleration of growth in population and in the labour force in the Second Development Decade will decrease the prospects of employment in many of the developing countries during this period.[31] Considering the availability of both human and natural resources, therefore, there is both an urgent need and a potential for faster growth of industry than was achieved in the First Development Decade.

Despite the vital role of the manufacturing sector in stimulating economic growth, it has to be recognized that this sector can create at best only a small fraction of the jobs needed in the 1970s. The manufacturing sector is still quite small in most developing countries.[32] Furthermore, it is apparent that, except for a few anomalous cases, each increment to manufactured output seems to require a smaller percentage increase in employment than in earlier periods.

Comparing the growth rates of manufactured output for all developing countries (see first page of this chapter) with the corresponding growth rates for manufacturing employment (table 29) reveals that each per cent of increase in manufacturing output in the periods 1955—1960 and 1960—1965 was associated with 0.6 per cent growth in employment. This "employment coefficient" fell, however, to 0.4 in the years 1965—1968.[33] In the latter period, a low and

[30] For a recent review of evidence on open unemployment in developing countries, see David Turnham, *The Employment Problem in Less Developed Countries*, OECD, Paris, 1970.

[31] For a similar assessment of unemployment prospects in developing countries, see Commission on International Development, *Partners in Development*, Praeger, New York, 1969, p. 13. For rates of growth of labour force in developing regions, 1950—1980, see UNIDO, *Industrial Development Survey*, Vol. II, p. 60.

[32] *Industrial Development Survey*, Vol. I, p. 250.

[33] The "employment coefficient" is the elasticity of manufacturing employment with respect to output.

TABLE 31. GROWTH OF NON-AGRICULTURAL EMPLOYMENT IN SELECTED DEVELOPING COUNTRIES, 1965—1970

Average and annual rates

(Per cent)

	Code	All non-agricultural employment				Manufacturing employment only			
		Remarks	1965—1970	1968—1969	1969—1970	Remarks	1965—1970	1968—1969	1969—1970
Latin America									
Chile	III		...	...	...	Wage earners only	—1.2	—0.1	—3.7
Colombia	III		...	...	...		1.2[a]	3.4	...
Ecuador	III		...	...	...		0.7[a]	2.8	...
El Salvador (San Salvador area)	III	Excl. mining	0.9[a]	—0.3	—6.6		0.3[a]	0.5	1.9
Guatemala	III		...	...	...	Wage earners only	1.8	0.2	5.1
Puerto Rico	I/III	Age 14 and over	4.1	5.1	3.6		4.2	2.9	—1.3
Trinidad and Tobago	I	Age 15 and over	1.5[a]	1.6	...		...	...	...
Venezuela	III		...	...	...		0.8	1.9	1.3[b]
Africa									
Sierra Leone	III		—0.3	2.9	—0.4		—3.7	1.7	—15.8
Zambia	III		6.1	1.2	7.4		6.3[c]	14.5	6.7
Asia									
China (Taiwan)	I	Age 15 and over	8.3	8.0	6.2		8.5[a]	22.5	...
India	III	Incl. working proprietors	1.6[a]	2.4	...		...	...	...
Korea, Republic of	I	Age 14 and over	6.1	3.5	4.2		11.4	2.2	2.3
Philippines	III		0.8	1.1	0.6		0.8	1.4	—
Ryukyu	I	Age 15 and over	4.3[a]	3.5	...		0.4	1.8	...
Hong Kong	III		...	...	...		10.4	13.5	6.4

Source: ILO, *Bulletin of Labour Statistics*, 1970, 1971 and 1971 Supplement. (See this source for a more detailed explanation of the basis for the data.)
Code: I—Labour force sample surveys; III—Statistics of establishments.
[a] 1965—1969.
[b] Establishments with less than 10 employees excluded beginning in 1969.
[c] 1966—1970.

clearly diminished coefficient is observed also for the Asian region. This tendency is not seen, however, in the Latin American region.[34]

Exceptional development in Latin America in the last few years does not alter the general picture of relatively low employment coefficients of output growth over the longer run nor of an apparent decline in the growth of employment in the second half of the 1960s in other regions, especially in the more modern (i.e. factory-organized) part of the manufacturing sector. The figure on page 64 shows the growth rates of output and employment for nine separate manufacturing industries in Asia and Latin America for the three periods. The upper diagonal line connects points having an employment coefficient of 1; the lower line represents coefficients of 0.75. Only 4 of the 50 points show coefficients greater than 1 and only 6 lie between 0.75 and 1.

The number of new jobs created in a particular industry is not an adequate measure of the total employment contribution arising from its expanded output. Nor does the internal development of a manufacturing sector tell the whole story of that sector's impact on the process of economic growth in general. There are other indirect and secondary employment effects resulting from inter-industry linkages and the generation of new income which reach beyond the original industry and beyond the confines of manufacturing as a whole. Besides the employment effects, the growth of industry is instrumental in the attainment of certain key social objectives of the developing countries, for example, the spread of technological knowledge or more equitable income distribution. However, there is very little basis for empirical research on these phenomena, or on the general influences extending outside the manufacturing sector.[35]

In seeking a disaggregated picture of manufacturing employment by single countries or by sub-sectors of manufacturing, one is confronted by the striking inadequacy of the statistics. With respect to manufacturing employment, the statistics published by the United Nations Statistical Office are aggregated into broad industry groups at the level of whole regions and give at best only a rough picture of the global trends, without much detail.[36] These statistics can be supplemented by country data published by the International Labour Office (ILO), but the ILO annual reports on manufacturing employment usually cover only sizable factory-organized enterprises and tend to exclude small and artisan

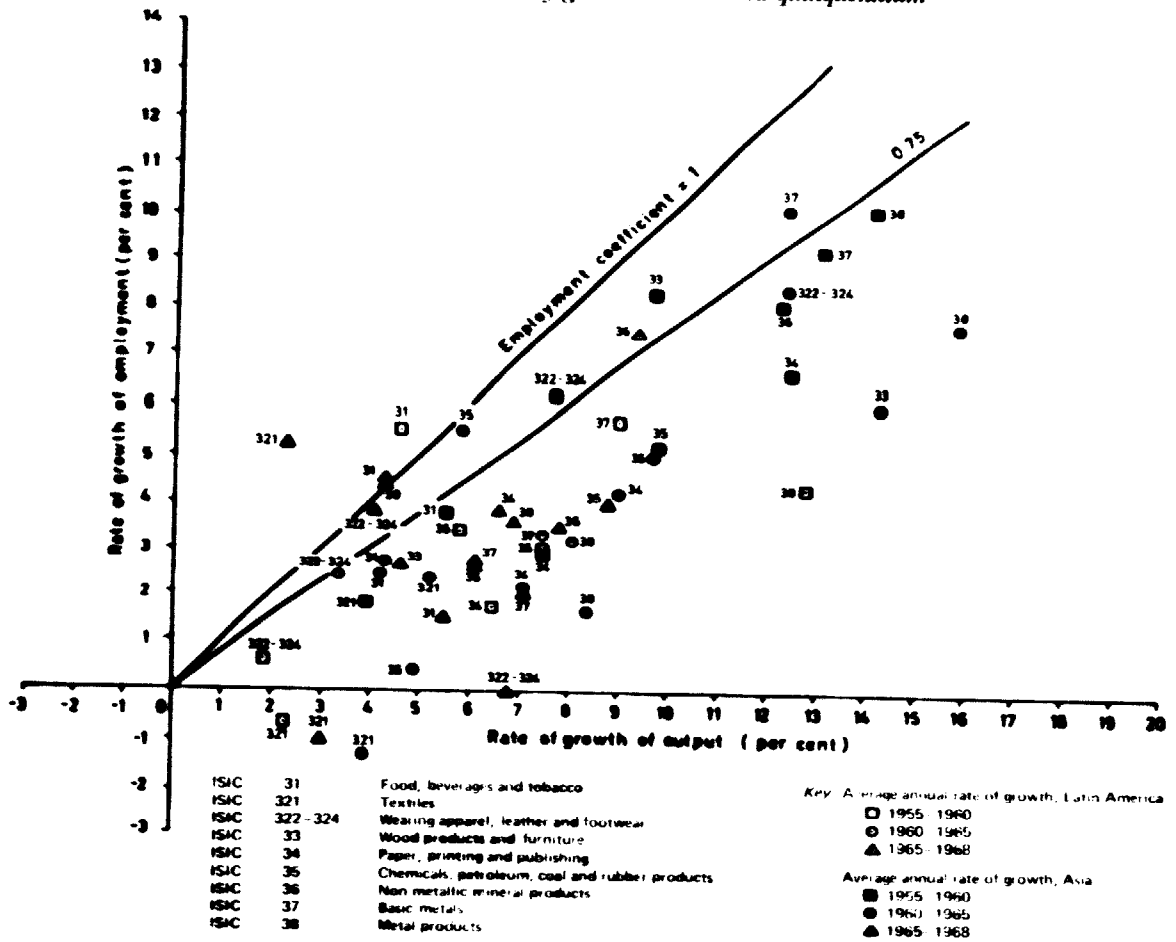
[34] Low rates of job creation relative to manufacturing output growth were recorded in Latin America in the periods 1955—1960 and 1960—1965, but these were suddenly reversed in the years 1965—1968, when the growth rate of employment jumped to 0.8 of the growth of output. In the food, beverages and tobacco industry group and in the textile industry, employment growth even appears to have outpaced output, although this anomaly may result from certain statistical peculiarities in the reporting on small producers.

[35] For further discussion on manufacturing employment, see UNIDO, *Industrial Development Survey*, Vols II and III. Appraisal of major structural changes in employment would call for data from population censuses. Findings of the censuses for the 1960s were discussed in Vol. I of the *Industrial Development Survey*. Tabulations of the population censuses carried out in 1970 are not yet available.

[36] In producing these published aggregates, the United Nations Statistical Office works with country data, some of which are also provided to UNIDO.

GROWTH OF OUTPUT AND EMPLOYMENT IN MAJOR MANUFACTURING INDUSTRIES

Average annual rate of growth in indicated quinquennium



Source: UNIDO, based on United Nations, *Statistical Yearbook*, and additional data supplied by the United Nations Statistical Office.

producers; moreover they include only a few developing countries.[37] Combining the data from both these sources provides only a sketchy picture of the inter-census changes of manufacturing employment in developing regions.

The sample of employment statistics for a small number of developing countries given in table 31 points to wide fluctuations in the growth rates of manufacturing employment in the period 1965–1970. With a few exceptions, such as Puerto Rico, China (Taiwan), the Republic of Korea, Hong Kong and Zambia, the countries for which comparable data are available attained very small increases or showed decreases in the level of employment in manufacturing in this period. It is often assumed that the manufacturing sector, although small, should expand its employment faster than other non-agricultural parts of the economy. Table 31 (which also records employment growth for the non-agricultural sectors as a whole) does not support this belief. Our information on the non-agricultural sectors outside manufacturing is far from complete, which makes it difficult to determine why, contrary to expectations, manufacturing employment increased so slowly. Possibly the output of the other non-agricultural activities grew faster than the manufacturing output. It could be that the failure of manufacturing to lead in job creation is explained by the wider use of labour-saving techniques in manufacturing industries, or by a shift in the product mix in this period towards less labour-intensive manufactured goods relative to goods from other non-agricultural sectors. Or it could be explained by differing practices governing workings hours and the use of overtime as contrasted to additional shifts or capacity widening which usually call for more labour. Unfortunately, it is not possible to evaluate the relative significance of these influences empirically, and it may be that the apparent growth of employment in the non-agricultural sectors results largely from the way the data were originally established.

Table 32 presents employment growth by major sectors of industry in developing regions in the 1960s. For developing countries in the aggregate and by regions, heavy manufacturing appears to have absorbed new labour more quickly than light manufacturing, except in Latin America in the period 1965–1968, when employment growth in heavy manufacturing fell sharply below that in light manufacturing for the year 1967 (see also table 33).

Examination of employment growth data in table 33 in certain ISIC two-digit and three-digit categories provides clues to recent trends and points to significant regional differences in growth. The textile industry, one of the oldest and most widespread among the light manufacturing industries in developing countries, has recorded the smallest percentage increases in employment in the past decade, despite an upsurge in employment in Latin America in 1966 and 1967. Employment in the textile industry appears to have experienced a decline

[37] The usefulness of these statistics is considerably reduced by the absence of annual data on manufacturing employment of the more populous developing countries needed for the ILO *Bulletin of Labour Statistics* and the *Yearbook of Labour Statistics*. Such omissions greatly reduce the value of the aggregate series for assessment of employment trends in the developing regions. One can hope that this information gap will be eliminated in the years of the World Employment Programme.

TABLE 32. GROWTH OF EMPLOYMENT, BY MAJOR SECTORS OF INDUSTRY, IN DEVELOPING REGIONS, 1960—1968
Average annual rate based on index numbers
(Per cent)

Industrial sector	*ISIC*	*Developing countries total*			*Asia*			*Latin America*		
		1960–1965	*1965–1968*	*1960–1968*	*1960–1965*	*1965–1968*	*1960–1968*	*1960–1965*	*1965–1968*	*1960–1968*
Total industry	2—4	3.9	2.1	3.2	4.6	1.5	3.4	1.6	4.5	2.7
Mining	2	0.2	2.6	1.1	0.8	3.6	1.7	...	...	...
Manufacturing, total	3	4.3	2.1	3.4	4.6	1.5	3.4	1.8	4.4	2.8
Light manufacturing	31—33, 342, 355—356, 39	3.7	1.8	2.9	4.2	0.6	2.8	1.4	4.8	2.6
Heavy manufacturing	341, 351—354, 36—38	5.6	3.7	4.6	6.6	3.5	5.4	2.5	3.8	3.0
Electricity, gas and steam	410	...	...	...	5.2	4.5	4.9	...	...	...

Source: UNIDO, based on United Nations, *Statistical Yearbook*, and additional data supplied by the United Nations Statistical Office.

TABLE 33. GROWTH OF EMPLOYMENT IN MANUFACTURING, BY MAJOR INDUSTRY GROUP, IN DEVELOPING REGIONS, 1960—1968

Average annual rate based on index numbers

(Per cent)

Industry group	*ISIC*	*Developing countries total*				*Asia*				*Latin America*			
		1966	*1967*	*1968*	*1960–1968*	*1966*	*1967*	*1968*	*1960–1968*	*1966*	*1967*	*1968*	*1960–1968*
Total manufacturing	3	1.8	3.6	0.9	3.4	0.9	2.7	0.9	3.4	6.5	4.4	2.5	2.8
Light manufacturing	31—33, 342, 355—356, 39	1.9	2.7	0.9	2.9	0.0	1.9	0.0	2.8	5.6	6.2	2.5	2.6
Heavy manufacturing	341, 351—354, 36—38	6.2	2.5	2.4	4.6	4.4	3.4	2.4	5.4	8.2	0.8	2.5	3.0
Food, beverages and tobacco	31	2.8	3.6	0.9	2.6	0.0	2.8	1.8	2.1	8.5	6.1	—0.8	3.3
Textiles	321	—1.9	4.0	0.0	1.5	—3.9	2.0	—1.0	1.0	4.9	11.1	0.0	1.1
Wearing apparel, leather and footwear	322—324	5.3	—0.8	—1.7	4.6	6.1	—2.5	—3.4	5.1	2.8	3.6	5.2	2.9
Wood products and furniture	33	0.9	4.5	3.5	4.4	0.9	4.5	2.6	4.8	...	...	...	...
Paper, printing and publishing	34	3.7	1.8	4.4	3.5	2.8	1.8	4.4	3.7	7.2	—0.8	5.1	2.7
Chemicals, petroleum, coal and rubber goods	35	4.6	5.3	2.5	4.3	2.7	4.4	5.0	4.9	7.8	3.6	—0.9	2.3
Non-metallic mineral products	36	4.6	4.4	0.8	4.1	3.6	3.5	0.8	4.1	6.0	12.3	4.2	3.0
Basic metals	37	8.1	—3.3	2.6	5.4	1.8	2.6	1.7	7.0	18.7	—11.8	3.6	3.1
Metal products	38	5.9	3.2	3.1	5.6	6.0	4.8	2.3	6.4	6.8	0.0	4.0	3.4

Source: UNIDO, based on United Nations, *Statistical Yearbook*, and additional data supplied by the United Nations Statistical Office.

in 1968 in Asia and stagnation in that year in Latin America. Another large industry group - food, beverages and tobacco - showed the second lowest rate of employment growth in Asia in the 1960s (2.1 per cent) and also in the developing region as a whole (2.6 per cent), although it provided one of the faster growing sources of employment in Latin America (3.3 per cent per annum). One could perhaps relate these low rates of job creation to the sluggish advances in output of these staple consumer goods.[38]

Significant regional differences in employment growth occurred among the heavy manufacturing industries. The basic metals and the metal products industries, which showed high rates of employment growth in Asia for the period 1960–1968 (7.0 and 6.4 per cent per annum respectively), did not experience particularly fast employment expansion in Latin America, although they recorded faster growth there than the average for all Latin American manufacturing. The difference between employment growth in these industries in the Latin American and Asian regions could be attributable to the existence in Asia of greater unexploited opportunities for import substitution.

Increasing attention has been focused recently on the importance of exporting to the development of the manufacturing sectors of developing countries and its corresponding role in generating employment. A high rate of output growth normally has a corollary in rapid growth of employment. These two variables are closely related in the data of table 34. A similar relationship has been observed in the industrially more advanced countries.[39] When focusing on the separate role of production for exports, however, no such close relationship may be found for developing countries, largely because of the still marginal size of manufactured exports from these countries. A study of these exports shows that they generally involve only 1 to 10 per cent of the output of the manufacturing sector, except for China (Taiwan) and the Republic of Korea where these exports account respectively for 36 and 18 per cent of output.[40] In spite of the remarkable growth of manufactured exports from certain countries it is clear from the data that, with few exceptions, they are only a minor part

[38] The demand for food, beverages and tobacco is typically regarded as inelastic with respect to income, increases in production and employment being limited largely to those needed to supply the increase in population. However, when migration to urban areas takes place, there is likely to be an increased *per capita* demand for certain necessities produced by the manufacturing sector. It is likely that the relatively quicker growth of the food, beverages and tobacco industry in Latin America derives in part from the higher rate of migration from rural to urban areas in that region.

[39] See N. Kaldor, *Causes of the Slow Rate of Economic Growth of the United Kingdom*, Cambridge University Press, 1966; also United Nations, *Economic Survey for Europe in 1969* (Sales Nos.: Part I-70.II.E.1; Part II-70.II.E.5).

[40] Bela Belassa, "Trade Policies in Developing Countries", *The American Economic Review*, May 1971. The percentages of manufactured exports in output in 1968 and 1969 were estimated for the following: Brazil 1; Argentina 2; Chile 3; Philippines 3; Mexico 5; Pakistan 8; West Malaysia 10; Republic of Korea 18; China (Taiwan) 36. It is worth noting that in the Republic of Korea and Taiwan a large part of their manufacturing for export is organized either under international subcontracting or in industrial free processing zones with only a limited reliance on indigenous raw materials.

TABLE 34. GROWTH OF MANUFACTURING OUTPUT, EXPORTS AND EMPLOYMENT IN SELECTED DEVELOPING COUNTRIES, 1960—1968

Compound annual rate of growth

	Period	*Manufacturing output (ISIC 2–3)*[a]	*Exports (SITC 5–8)*[b c]	*Manufacturing employment (ISIC 2–3)*
Latin America				
Argentina	1960—1968	3.2	17.8	—0.4
Brazil[d]	1960—1968	4.3	26.8	1.9
Chile	1960—1968	5.4	...	3.5
Colombia[e]	1960—1968	5.6	29.8	1.8
Dominican Rep.[f]	1960—1968	1.5	—0.2	3.5
Ecuador	1960—1968	11.7	—2.9	0.5
El Salvador	1960—1968	14.0	36.2	15.1
Honduras	1960—1966	12.0	37.7	3.0
Mexico[g]	1960—1968	8.4	7.4	7.3
Panama[g]	1960—1968	9.8	37.8	8.4
Peru	1960—1968	8.5	—1.5	2.8
Venezuela[h]	1960—1968	7.7	...	5.1
Asia				
Ceylon[i]	1960—1967	9.3	—1.0	...
China (Taiwan)	1960—1967	15.9	28.1	10.1
India	1960—1967	6.3	4.3	4.4
Iran[j]	1962—1967	16.9	14.2	9.2
Korea, Rep. of	1960—1967	12.3	82.2	12.4
Philippines[k]	1960—1968	6.1	18.6	0.8

Source: UNIDO, based on output and employment data supplied by the United Nations Statistical Office; export data from *Yearbook of International Trade Statistics*.

[a] ISIC, Rev. 1.

[b] Based on values of exports in local currency transferred into US$ at exchange rates as reported in *Monthly Bulletin of Statistics*.

[c] For Dominican Republic: 1962–1967. For Ecuador: 1960–1964. For Honduras: 1960–1968. For Peru: 1960–1963. For China (Taiwan): 1962–1967. For Iran: 1963–1967. For the Philippines: 1961–1968.

[d] Manufacturing output and employment exclude ISIC 39.

[e] Manufacturing output and employment exclude ISIC 29, 30, 34 and 39.

[f] Manufacturing output and employment exclude ISIC 25–26, 28, 29, 35–38 and 39.

[g] Manufacturing output and employment exclude ISIC 28, 30, 34 and 35–38.

[h] Manufacturing output and employment exclude ISIC 29.

[i] Manufacturing output excludes ISIC 28, 29 and 34 (the reported employment growth is not consistent with other data and is not presented here).

[j] Manufacturing output and employment exclude ISIC 27, 28 and 34.

[k] Manufacturing output and employment exclude ISIC 34.

of total exports.[41] Statistically, therefore, employment growth in the manufacturing sector as a whole is not closely related to the export performance in this sector.[42]

[41] For 9 of the 18 countries in table 34, manufactures contributed less than 5 per cent of total exports; for 4 others the share ranged between 8 and 11 per cent; the remaining 5 countries exported manufactures with a gross value of 15 to 73 per cent of the value of their total exports, with China (Taiwan) and the Republic of Korea ahead. It must be recognized that these shares refer to the gross value of goods involving some manufacturing processing and not to the value added by manufacturing.

[42] A statistical test for 15 of the countries shown in table 34 (using comparable data for the growth of exports and of employment in manufacturing) brought a coefficient of determination (R^2) equal to 0.33. Denoting the rate of growth of exports of manufactures by X and the rate of growth of manufacturing employment by Y, the following equation was derived by the least-squares method: $Y = 0.13X + 2.5$ (the standard error of estimate is 4.1). The coefficient of X is statistically non-zero at the 95 per cent level of confidence.

Exporting of manufactures is, however, a relatively new experience for developing countries. Although it has not yet emerged as an effective stimulus to the over-all growth of employment in manufacturing, the experience of exporting constitutes an important incentive to innovation and product improvement and to the upgrading of technical and managerial skills. Moreover, the history of developed countries and of a few developing countries confirms that exports can potentially become a dynamic component of output growth and a stimulus to the development of inter-industry links, and ultimately to employment.

To conclude this review of employment growth it is relevant to turn briefly to labour productivity. Estimates of value added per person engaged in manufacturing in 1963 indicated that the level of these data for developing countries was only about one sixth of that for industrialized countries.[43] This figure reflects many variations in production processes, including different output mixes and widely diverse ratios of capital to labour. There were some industries with much higher relative levels of labour productivity, but these are few and rather isolated cases.[44] The limited scope of the high productivity industries is reflected in the fact that ISIC two-digit industries, in which value added per person engaged was at least 75 per cent of the average for all industrialized countries, accounted for only 1.1 per cent of total manufacturing employment in all developing countries.[45] Even if one should drastically lower the standard of high productivity in developing countries to include all industries with productivity at least 50 per cent as high, these industries would still employ only 4.2 per cent of the manufacturing manpower.

Statistics on the growth of output per person engaged suggest that since 1963 the developing countries have attained smaller productivity increases than the developed market economies or the centrally planned economies. The respective indices for these economic groupings for 1968 were 120, 127 and 128 (1963 = 100). Thus, the gap in labour productivity between the developing countries and the more industrialized regions appears to have widened in the First Development Decade. It must be emphasized, however, that maximization of increases of labour productivity in all industry is not a prime objective of development. The appropriateness of the production technique has to be judged with reference to development objectives (income growth acceleration, employment creation, greater equality in income distribution etc.) and to factor endowment in the respective economic groupings. Besides the differing productivity, changes may reflect other influences, such as: diverse changes in the mix of output; a slower increase in real wages relative to machine-time costs in developing countries; less effective competition among firms; or fewer opportunities for economies of scale. The last two items in particular underscore

[43] See UNIDO, *Industrial Development Survey*, Vol. III, p. 7.

[44] For details, see United Nations, *The Growth of World Industry—1968 Edition: Vol. I: General Industrial Statistics 1958—1967* (Sales No.: 70.XVII.18); and UNIDO, *Industrial Development Survey*, Vol. III, pp. 74—75.

[45] Puerto Rico is excluded from the developing countries in this comparison.

the urgency for developing countries to increase regional co-operation and expand their manufactured exports.[46]

Major issues concerning employment and industrial development

No single main cause can be identified to explain the fact that labour absorption into the manufacturing sector in developing countries has been small and may even have slowed over time. Manufacturing industries are established under conditions that are too diverse to permit generalization. A number of structural, technical and institutional factors should also be taken into account.

To start with, both import-substitution facilities and deliberate efforts to accelerate economic growth through industrialization typically imply the introduction of new products which are more capital intensive than the old ones. Capital-intensive, factory-organized methods are essential to the technology of producing many basic products such as paper, glass or cement. Frequently, these processes also rely relatively heavily on imported equipment and materials. This has been the typical experience in many Latin American countries. In Asia, the establishment of basic industries, induced by post-independence development policies, brought structural change of a somewhat different type, but it also tended to be capital intensive.

The opinion is widespread that the tendency to use capital intensive labour-saving techniques in manufacturing has been strengthened by major distortions in the relative prices of these two factors compared to their true "social costs". There is no doubt that over-valued exchange rates, combined with various investment subsidies and excessive investment and depreciation allowances, often make imported capital goods artificially cheap relative to labour or even to locally made capital goods. Interest rates on investment loans are also often subsidized for enterprises having access to limited funds. On the other hand, the social security costs through payroll taxes increase labour costs, often substantially.

Any substantial effect of such distortions of factor prices at the actual level of employment presupposes the existence of effective technical choices. As a rule, the existing equipment can only be combined efficiently with certain numbers of workers, so that relatively cheaper labour would have little effect on employment in such cases. There are also many limitations on the choice of new equipment, of which a very important one is insufficient information on techniques available in various countries. Empirical evidence suggests that the scope for using substantially more labour-intensive techniques in manufacturing is not wide and is probably more limited than in other sectors of the economy, such as agriculture and construction, where the impact of capital-substituting techniques on employment is likely to be significant. Nonetheless, a step-by-step analysis of the production process may indicate greater room for flexibility. The wider use of multi-shift operations may also offer an option for increased labour intensity.

[46] For a further discussion of means to advance labour productivity open especially to developing countries, see UNIDO, *Industrial Development Survey*, Vol. III, p. 73.

Income distribution is also said to contribute to the low rate of job creation by manufacturing in that it influences the pattern of consumption. This pattern is reflected in the differences between the labour content of domestic goods purchased mainly by the rich and those consumed by the poor. The higher import content of the purchases of higher income groups is also significant. The negative effects of the pattern of income distribution in some Latin American countries on their level of employment have been stressed earlier in many studies and reports.[47] These influences do not appear to be peculiar to Latin America but are relevant to industrial development and employment in other regions as well.

Finally, in considering the relatively low labour absorption in manufacturing one must mention the likelihood that the expansion of factory-organized production supplants to some extent enterprises in the artisan sector.[48] The artisan sector of manufacturing continues to participate widely in many lines of processing in developing countries. Even in some of the industrially most advanced developing countries, the artisan sector in its various forms engages about half of the total manufacturing employment.[49] There are a number of reasons for this displacement, some of which have been alluded to above, for example, shifts of demand towards factory-made products stemming from urbanization, advertising and other forces bearing on consumer tastes. Second, there are the advantages of factory methods for supervision, efficiency and quality control. It is also true that credit and government assistance are more often available for larger industrial concerns than for smaller ones.

There is no uniformity in the quantitative significance of this displacement, however, since the artisan tradition has been developed and preserved to different extents in various countries. The main point is that the substitution of factory methods of production for the traditional ones used in various artisan and semi-artisan activities represents a major technological change in developing countries with considerable employment implications.[50]

[47] "The very diversification of manufacturing production in response to the changes in the demand and the possibilities of import substitution has led to more rapid development of the production lines that tended to be less labour-intensive in comparison with the traditional branches, whose naturally slow tempo of growth has been made even more sluggish by persistently regressive features in income distribution." See United Nations, *The Process of Industrial Development in Latin America*, New York, 1966, p. 74.

[48] To the extent that such displacement has in fact taken place, the industrialization process of the past two decades might have resulted in a growth rate of a total manufacturing employment smaller than 4 per cent per annum credited earlier to the factory-organized sector in developing countries. Indirect employment effects stimulated by new manufacturing activities might have increased employment opportunities in some other sectors including the artisan sector.

[49] See United Nations, *The Process of Industrial Development in Latin America*, New York, 1966, p. 75.

[50] The distinction between the so-called "modern factory sector" and the "traditional one" lies mainly in the amount of power and equipment used and system of management, and does not necessarily presuppose the size of establishment. It follows that various forms of employment under subcontracting, including home workers, belong to the modern sector if they work for a factory-organized firm.

The employment effects of this technological change in developing countries differ significantly from those experienced by the developed countries at the times when they were undergoing industrialization. The difference in capital intensity between industrial and artisan manufacturing was clearly smaller in those times than it is now, and productivity of industrial workers was correspondingly less, so that additional workers in manufacturing displaced a much smaller number of artisans than would be the case today.

There is little empirical evidence concerning the separate growth patterns of artisan and factory employment in various types of manufacturing in developing countries. The available data pertain mostly to Latin America. What has occurred there, however, may have some relevance for other developing regions since this region is the most advanced in industrialization. Factory employment in Latin America in 1960 accounted for 48 per cent of the total of manufacturing employment, including artisan establishments. From 1950 to 1965, factory employment in the region increased at the rate of 3.2 per cent per annum. Since employment in the artisan sector increased in this period at the rate of 1.4 per cent, the resulting growth rate for all manufacturing employment was only 2.3 per cent.[51] Examination of the trends of manufacturing employment in Latin America in the preceding two and a half decades (1925–1950) indicates that artisan employment increased in that period at a much slower rate than employment in the factory sector. While factory employment grew at an average rate of 4.8 per cent per annum, artisan employment increased at only 0.8 per cent per annum, yielding a 2.2 per cent growth rate for the entire manufacturing sector.[52]

Displacement of the artisan sector, therefore, has taken place only in terms of its share of manufacturing employment but not in terms of a decline in the absolute number of artisans. Factory methods will not displace all artisan functions nor will the artisans whose functions become uneconomic discontinue their trades immediately. Frequently they continue their work until better employment opportunities are open to them or their families. At the same time, the growth of manufacturing is a direct stimulus for certain new demands for artisan activities, such as the repair and maintenance of industrial equipment, and it tends to stimulate the demand for artisan labour servicing consumer durables or for craftsmen producing luxury or handicraft products for more affluent customers at home or abroad. Industry can also offer opportunities for artisan co-operation in factory-organized production through subcontracting. The experience of Japan and some Asian countries is particularly relevant here. It is difficult, however, to obtain an empirical measure of the effects of modern industry's growth on employment in other sectors in developing countries. UNIDO is undertaking a study of these phenomena.

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[51] Calculated from data given by Esteban Lederman, *Los Recursos Humanos en el Desarrollo de América Latina, Cuadernos del Instituto Latino-Americano de Planificaciones Económica y Social*, Series II, No. 9, Santiago, Chile, 1969.

[52] See "Structural Changes in Employment within the Context of Latin America's Economic Development", *Economic Bulletin for Latin America*, Vol. X, No. 2, October 1965.

Apparently, in contemplating the future growth of industry in developing countries, one must reckon with a continuing decline in labour intensity and the displacement of artisan enterprises. It may be suggested, therefore, that greater selectivity in mechanizing factory functions and resorting to subcontracting to the artisan sector whenever practical would create more new jobs and prevent dislocation from existing ones without harming efficiency. On the other hand, selective mechanization and upgrading of the management of artisan shops would help to improve efficiency there. The establishment of institutions to provide technical, marketing and financial services to the artisan sector would help it to make the most of opportunities to integrate its activities with those of the faster growing sectors of the economy, including modern agriculture and the services.

Before concluding, it is important to review employment prospects in the export-oriented industries upon which much emphasis is now being placed in industrial planning. As indicated earlier in this chapter, the experience of clearly export-led industrial growth in developing countries is still limited to a very few countries, mainly in East Asia, and is too sparse and specific to warrant general conclusions about the potential impact of this development pattern on employment. It should be noted, however, that the importance of ever-expanding foreign-exchange earnings to sustained development may leave little scope in export industries for compromising efficient production through schemes to force the absorption of labour. Nonetheless, a careful selection of export industries to be promoted, and of items to be produced, may take employment into account as an objective. Developing countries may choose sectors which, although employing modern technology, have at the same time a higher relative employment capacity as well as a greater potential demand on the world market. Such industries—for instance, electronics, optical goods and machine tools—may be developed under international subcontract. Further, a judicious choice of measures to attract suitable activities to industrial free processing zones may enhance job creation through the exports of manufactures, either directly or by leading to greater employment opportunities in related services and input-producing industries.

Industrial employment in the Second Development Decade

The International Development Strategy for the Second Development Decade calls for an annual rate of growth of at least 6 per cent in the gross domestic product of developing countries as a group. Achievement of this goal for the whole economy implies an 8 per cent annual growth of industrial output. This target growth rate for industry is higher than the actual performance recorded in the First Development Decade when about 7 per cent per annum was attained. No specific employment objectives have been formulated under the International Development Strategy. It is recommended only that "each developing country should formulate its national employment objectives so as to absorb an increasing proportion of its working population in modern activities and to

reduce significantly unemployment and underemployment".[53] Moreover, while stressing the need for expanded investment to achieve these objectives, the Strategy recommends that "whenever a choice of technology is available, developing countries will seek to ensure that capital-intensive technology is confined to uses in which it is clearly cheaper in real terms and more efficient".[54] If the postulated targets for manufacturing output are to be attained with the rate of productivity gains prevailing in the 1960s, this would presuppose an increased contribution by industry to the provision of employment relative to the preceding decade. Even this increased rate of job creation may not suffice to absorb industry's share of the accelerated growth of labour force in the 1970s. In any event, the International Development Strategy makes it clear that success requires that the promotion of employment as well as output be included as explicit objectives.

At the level of individual developing countries, there are only a few that appear to be committed to specific employment targets among basic objectives of their industrial development plans.[55] It is common for employment objectives to be formulated within a general statement on employment policy and investment priority criteria, with guidelines and perhaps targets for the provision or upgrading of managerial and technical skills. Only in a few instances have explicit employment targets for industry been reported among the newly prepared plans. Many national plans implicitly or explicitly include growth rates of labour force and employment or manpower projections by sector; these are not treated as targets, however, but as implications of the planned rates of output growth or of expansion of education.[56]

As another aspect of the international effort for economic development in the 1970s, inter-agency missions have been organized by ILO for a few countries in an attempt to design strategies taking into account the unemployment problem existing there. UNIDO has sponsored the participation in such missions of consultants for the industrial sector. It is too early to assess the results of these efforts. It is clear, however, that the solution of employment problems calls for an acceleration of output growth, and that it cannot be isolated from a wide range of other issues such as land reform, income distribution, exchange rates etc.[57]

The development of the industrial sector itself must be designed to serve more than one objective. In addition to creating jobs, its growth should stimulate

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[53] See United Nations, *International Development Strategy for the Second United Nations Development Decade* (Sales No.: 71.II.A.2), para. 18 (a).

[54] *Ibid.*, para. 66.

[55] See UNIDO, *Summaries of Industrial Development Plans*, 2 vols, Vienna (Vol. I-UNIDO/IPPD. 11, 1970; Vol. II-UNIDO/IPPD. 54, 1971).

[56] *Ibid.* See, for instance, "Summary of the Industrial Development Plan for Kenya, 1970—1974", Vol. II, pp. 266—295; and "Summary of the Industrial Development Plan for the United Republic of Tanzania, 1969—1974", Vol. II, pp. 316—350.

[57] ILO, *Towards Full Employment, A Programme for Colombia*, prepared by an inter-agency team, Geneva, 1970; see also, ILO, *Matching Employment Opportunities and Expectations, A Programme of Action for Ceylon*, report of an inter-agency team, Geneva, 1971.

the growth and modernization of other sectors of the economy, and it must achieve a vigorous expansion of manufactured exports. The types of activities that contribute to these other goals, however, do not always generate large numbers of jobs. A job-oriented strategy within industry typically emphasizes modernization of the artisan sector and its integration into the rest of the economy. All of these objectives must be blended into a co-ordinated strategy. Provision and upgrading of managerial and industrial skills and of applied industrial research emerge as a vital link serving both of these aspects of industrial development.

Chapter IV

INVESTMENT AND INDUSTRIALIZATION

This chapter considers investment in manufacturing[58] and its contribution to the expansion of output. First, the rate of growth of investment in manufacturing is estimated for those developing countries for which the necessary information exists. Second, the level of fixed capital formation in each country and its distribution among types of capital good are analysed with attention focused especially on investment in machinery and equipment, which is regarded as particularly relevant to manufacturing. Third, the relationship of investment in machinery and equipment to manufacturing output is investigated. Finally, the flow of capital to developing countries from abroad is examined.

The contribution of investment to increasing output has sometimes been exaggerated in the past. As demonstrated in Volume III of the *Industrial Development Survey*, the devotion of a high proportion of GDP to investment does not guarantee rapid growth of output.[59] Differing capital-output ratios of various production processes and possible changes in rates of equipment utilization and retirement complicate this relationship. Investment of a high rather than a low proportion of GDP, however, is generally considered more favourable to output growth, and capital remains one of the important factors in the development equation.

Growth of investment in manufacturing

Investment in manufacturing and other sectors for 13 developing countries between 1955 and 1964 was examined in Volume I of the *Industrial Development Survey*.[60] Volume III considered similar data for 23 countries for differing periods between 1960 and 1967.[61] It is possible to expand these lists of countries by

[58] Data on investment in manufacturing are one of the least satisfactory items in the national income accounts of the developing countries. Only a few developing countries complete the questionnaire of the United Nations Statistical Office which provides the basis for the information published in the *Yearbook of National Accounts Statistics*. No alternative to the *Yearbook* is as satisfactory a source of investment data, however, since all of manufacturing is only rarely covered, and no other source contains data that may be compared country by country.

[59] See UNIDO, *Industrial Development Survey*, Vol. III, pp. 103—106.

[60] UNIDO, *Industrial Development Survey*, Vol. I, table 56, pp. 154—155, and pp. 153—157.

[61] UNIDO, *Industrial Development Survey*, Vol. III, pp. 80—81 and table 39, pp. 82—83.

referring to the growth of investment in all types of machinery and equipment as a proxy variable for the growth of investment in manufacturing, where data on the latter are lacking.

Many of the developing countries, when reporting to the United Nations on their capital investment, classify these investments by "type of capital good".[62] Within this classification, investment in machinery and other equipment (hereafter referred to as "machinery") serves most nearly as a proxy for investment in the manufacturing sector. Machinery does not include transport equipment but does encompass certain other kinds of equipment not used in manufacturing, for example, agricultural machinery. Table 35 compares the rate of growth of investment in machinery with the growth rate of investment in manufacturing for 13 countries for which it was possible to obtain this information for a period covering at least four years in the First Development Decade. The figures for growth of investment in machinery roughly parallel those for investment in manufacturing, thus demonstrating that they provide a good indicator of the growth of investment in the manufacturing sector.[63]

Certain developing countries report investment by type of capital good without distinguishing transport equipment from machinery and other equipment. If the growth of investment in transport equipment is included in the comparison, the sample of countries for which data exist may be expanded from 13 to 16 (see table 35). The addition of transport equipment to the category of machinery does not alter essentially the correlation between investment in machinery and investment in manufacturing.[64]

Table 36 gives the growth rates of fixed capital formation by types of capital good for selected developing countries. The growth rates are based on data at constant market prices, making possible comparisons among countries, and they are taken for the longest possible period in the First Development Decade, in most cases 1960—1968.

Seven of the 14 Latin American countries had growth rates of total fixed capital formation in excess of 10 per cent. However, the unweighted average for this growth rate in Latin America, 8.2 per cent, was the lowest for the three developing regions. This reflects the decline in fixed capital formation in Argentina and Uruguay, and the slow growth of this variable in Chile and Colombia.[65]

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[62] For the definition of the various categories, see United Nations Statistical Office, *Yearbook of National Accounts Statistics, 1969: Vol. I — Individual Country Data* (Sales No.: 71.XVII.2), pp. XXIII—XXIV.

[63] Calculated on the basis of the 19 observations in table 35, the growth of investment in manufacturing, variable Y, is related to the growth of investment in machinery, variable X, by the equation $Y = 1.99 + 0.95X$. The correlation coefficient between the two variables is 0.87.

[64] Calculated on the basis of the 24 observations in table 35, the growth of investment in manufacturing, variable Y, is related to the growth of investment in transport equipment and machinery, variable Z, by the equation $Y = 3.29 + 0.88Z$. The correlation coefficient between the two variables is 0.85.

[65] Comparable data are not available in United Nations, *Yearbook of National Accounts Statistics*, for Brazil and Mexico, two of the largest industrial countries in Latin America.

TABLE 35. COMPARATIVE GROWTH OF INVESTMENT IN MANUFACTURING AND IN MACHINERY AND EQUIPMENT FOR SELECTED DEVELOPING COUNTRIES

Average annual rate[a]

(Per cent)

	Period	Prices	Growth of investment in		
			Manufacturing	*Machinery*	*Machinery and transport equipment*
Bolivia[b]	1960—1962 to 1966—1968	current	11.4	9.2	9.8
	1960—1962 to 1966—1968	constant	8.4	5.0	5.6
China (Taiwan)	1960—1962 to 1966—1968	current	25.8	21.7	20.8
Ethiopia	1961—1963 to 1965—1967	current	18.0	...	14.8
Guatemala[c]	1960—1961 to 1962—1964	current	14.4	...	15.2
	1960—1961 to 1962—1964	constant	10.5	...	12.4
Iraq	1960—1962 to 1966—1968	current	16.2	9.0	7.5
	1960—1962 to 1966—1968	constant	15.3	8.5	6.8
Jamaica	1960—1962 to 1965—1967	current	2.7	6.8	7.1
Kenya	1964—1965 to 1966—1968	current	25.9	20.8	21.1
	1964—1965 to 1966—1968	constant	21.7	18.4	18.7
Korea, Republic of	1960—1962 to 1966—1968	current	47.5	45.3	47.7
	1960—1962 to 1966—1968	constant	28.1	25.7	28.3
Mauritius	1960—1962 to 1966—1968	current	—9.9	—2.0	—0.5
Philippines	1960—1962 to 1963—1965	current	10.7	21.9	23.1
Singapore[d]	1960—1962 to 1966—1968	current	18.7	18.7	17.7
Southern Rhodesia	1964—1965 to 1966—1968	current	11.9	...	5.0
	1964—1965 to 1966—1968	constant	7.5	...	—0.1
Syrian Arab Republic[e]	1961—1963 to 1966—1968	current	16.3	8.4	8.7
	1961—1963 to 1966—1968	constant	17.5	10.0	10.3
Thailand	1960—1961 to 1962—1963	current	18.8	26.0	23.1
	1960—1961 to 1962—1963	constant	16.0	22.7	19.9
Tunisia	1960—1962 to 1965—1967	current	24.7	18.8	15.5
Venezuela	1960—1962 to 1966—1968	constant	4.0	2.7	5.4

Source: UNIDO, Based on United Nations, *Yearbook of National Accounts Statistics, 1969*, Vol. I.

[a] The average for the later period compared with the average for the earlier period.

[b] Manufacturing, including construction.

[c] Manufacturing, including mining and quarrying.

[d] Manufacturing, including mining, quarrying and construction.

[e] Manufacturing, including mining, quarrying, electricity, gas and water.

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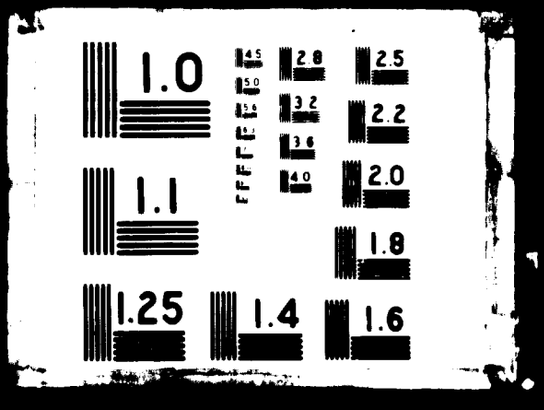

TABLE 36. COMPARATIVE GROWTH OF FIXED CAPITAL FORMATION BY TYPE OF CAPITAL GOOD AT CONSTANT MARKET PRICES FOR SELECTED DEVELOPING COUNTRIES

Average annual rate[a]

(Per cent)

	Period	Total fixed capital formation	Construction and works			Machinery and equipment		
			Land and dwellings	Non-residential buildings	Other construction and works	Transport equipment	Machinery	Machinery and transport equipment[b]
Latin America								
Argentina	1960—1962 to 1966—1968	—0.1		2.5		1.0	—3.4	—1.9
Bolivia	1960—1962 to 1966—1968	8.6	28.5	7.8	9.8	...	...	5.6
Chile	1961—1963 to 1966—1968	2.4	2.1	1.5	—0.3	...	...	4.7
Colombia	1960—1962 to 1965—1967	1.6	2.2	—9.4	6.8	—4.0	1.3	—0.2
Dominican Rep.	1960—1962 to 1966—1968	12.4		11.6		10.8	16.7	14.0
Guatemala	1960—1962 to 1966—1968	9.0	6.0	4.6		...	...	11.9
Honduras	1960—1961 to 1963—1964	12.2	5.5	6.5	14.4	...	...	18.4
Nicaragua	1960—1962 to 1966—1968	13.7	6.1	18.7	14.4	...	...	14.2
Panama	1960—1962 to 1966—1968	11.9	12.4	11.6	6.4	12.7	13.5	13.3
Paraguay	1962—1964 to 1966—1968	13.7		11.4		12.0	18.2	16.0
Peru	1960—1961 to 1962—1963	12.6		5.8		...	...	18.9
Puerto Rico	1960—1962 to 1966—1968	11.8	14.0	11.5		...	...	10.2
Uruguay	1960—1961 to 1962—1963	—1.9		12.6		...	...	20.2
Venezuela	1960—1962 to 1966—1968	7.1	15.0	6.0		9.0	2.7	5.4
Average		8.2				6.9	8.2	10.8

Asia								
Ceylon[c]	1960—1962 to 1966—1968	3.9	7.6	5.9	6.2	—3.8	—1.5	—2.1
China (Taiwan)	1960—1962 to 1966—1968	17.5		13.0		19.1	22.2	21.6
Cyprus	1960—1962 to 1966—1968	8.6	7.6	13.6	7.0	7.0	8.8	8.3
Indonesia[d]	1960—1962 to 1966—1968	1.5		—2.5		...	...	±0.0
Iraq	1960—1962 to 1966—1968	2.3	1.3	—0.6	0.2	2.5	8.5	6.8
Korea, Rep. of[e]	1960—1962 to 1966—1968	23.5	13.1	21.3	22.5	33.9	25.7	28.3
Philippines	1960—1962 to 1966—1968	10.4		10.8		...	...	10.0
Syrian Arab Rep.	1961—1963 to 1966—1968	5.7	—1.7	—2.9	5.2	11.2	10.0	10.3
Thailand	1960—1962 to 1965—1967	16.9	2.0	22.7		17.1	16.0	16.3
Average		10.0				12.4	12.8	11.1
Africa								
Kenya	1964—1965 to 1967—1968	19.1	15.1	23.4	21.0	18.7	19.1	18.9
Libyan Arab Rep.[f]	1962—1964 to 1966—1968	20.3	2.8	31.7		...	...	21.9
Malawi[e]	1960—1961 to 1962—1963	—11.5	...	—14.8	22.5	...	...	—3.2
Morocco[e]	1960—1962 to 1966—1968	6.8	...	3.6	9.0	...	...	6.6
Nigeria[e]	1960—1962 to 1964—1966	9.2	10.7	2.9	9.2	18.8	13.1	14.4
Sierra Leone	1963—1965 to 1966—1968	3.4	7.1	8.0	4.7	—3.1	3.4	0.7
Southern Rhodesia	1964—1965 to 1967—1968	5.9		8.3		...	...	3.1
Zambia	1964—1965 to 1967—1968	23.2		16.5		...	...	33.0
Average		9.6				11.5	11.9	11.9

Source: United Nations, *Yearbook of National Accounts Statistics, 1969*, Vol. I.

[a] The average for the later period compared with the average for the earlier period.
[b] These rates are weighted averages of the rates shown in the preceding two columns.
[c] Dwellings are included in non-residential buildings.
[d] Gross domestic capital formation.
[e] Land is included in dwellings and other construction.
[f] Dwellings are included in non-residential buildings and other construction.

Data on growth of investment in machinery, used here as a proxy for growth of investment in manufacturing, were available for only six of the Latin American countries. This information indicates that the capital formation in the manufacturing sector, though not necessarily the output of that sector, has been growing especially rapidly in the Dominican Republic and Paraguay and, to a lesser extent, in Panama.[66] Investment in manufacturing appears to have expanded slowly or not at all in the other three countries for which data are available—Argentina, Colombia and Venezuela. If growth of investment in machinery and transport equipment is used as a proxy for growth of investment in manufacturing, eight additional countries may be considered. This enlarged sample gives a somewhat more encouraging over-all picture. If judged from these data, industrialization in this region appears to have been widespread in the First Development Decade, as evidenced by the fact that investment in manufacturing in 9 of the 14 Latin American countries in table 36 grew at a rate in excess of 10 per cent.

The average growth rates for 9 Asian countries, shown in table 36, give an impression of better performance in total capital formation and investment in manufacturing than do those for the Latin American countries. The averages for Asia, however, are influenced preponderantly by the situation in China (Taiwan) and the Republic of Korea.[67] If these two countries are excluded, the averages for the growth of fixed capital formation and of investment in machinery and transport equipment are reduced to 7 and 7.1 per cent respectively, or rates lower than those for Latin America. Both India and Pakistan are omitted because no comparable information was available on these countries.

For China (Taiwan) the average annual growth rates over the period 1960–1968 were 17.5 per cent for fixed capital formation, 22.2 per cent for investment in machinery and 21.6 per cent for investment in machinery and transport equipment. For the Republic of Korea the corresponding percentages were even higher, 23.5, 25.7 and 28.3 per cent respectively. China (Taiwan) increased its share of the total manufacturing output of Asian developing countries from 2.9 per cent in 1963 to 4.9 per cent in 1968. The corresponding figures for the Republic of Korea were 3.6 per cent in 1963 and 6.2 per cent in 1968. If these trends continue, these two countries will soon possess industrial economies of considerable importance. Of the remaining seven Asian countries listed in table 36, Thailand appears to have made the most progress in raising the level of investment in manufacturing. Ceylon and Indonesia made the least industrial progress over the period 1960–1968.

Three of the eight African countries listed, namely Kenya, the Libyan Arab Republic and Zambia, had exceptionally high growth rates for fixed capital formation during the mid-1960s. In these three countries, investment in machinery and transport equipment also evidenced a high growth rate. However, in Libya this component of fixed capital formation reflects the heavy investment

[66] Table 46 shows that the growth of the share of manufacturing output in GDP in the Dominican Republic and Paraguay during the First Development Decade was disappointing, in contrast to the growth of capital in these two countries.

[67] It must be remembered that these are unweighted averages.

made in oil extraction, and in Zambia it reflects the expansion of the copper mines. Hence, it is not clear whether these high growth rates imply similarly high rates for investment in manufacturing. Of the countries listed, Malawi and Sierra Leone show the smallest increase in investment in their manufacturing sectors.

Level and structure of investment

This section considers the level of fixed capital formation as a percentage of GDP in selected developing countries, and the distribution of this investment among five types of capital good. Special attention is paid in this analysis to machinery and transport equipment, the two types of greatest relevance to industrialization. Tables 37, 38 and 39 show these components as percentages of GDP over two time periods in the First Development Decade for Latin American, Asian and African countries.[68] Tables 40 and 41 compare the frequency distribution of these countries by the percentage of GDP allocated to fixed capital formation and to machinery and transport equipment in each region over the later period indicated in tables 37, 38 and 39.

The Latin American countries had the best performance if judged by the percentage of GDP devoted to investment, with an average for the later period of 19.1 per cent (table 37), as compared with 18 per cent for the Asian countries (table 38) and 17.5 per cent for the African countries (table 39). Table 40 indicates that 10 out of the 18 Latin American countries were investing more than 18 per cent of their GDP in fixed capital in this same period. This generally higher level of investment in Latin America was probably partly a result of the industrialization policies pursued by these countries. These policies placed heavy emphasis on import substitution, which, in comparison with the policy of export promotion followed by certain countries in other regions, requires more capital per unit of output. It probably also reflects higher *per capita* income levels in Latin America.

Although it was established earlier in this chapter that the growth of investment in machinery and transport equipment could serve as a proxy for the growth of investment in manufacturing, the levels of the two variables do not correspond as closely, since investment in machinery and equipment encompasses all sectors of the economy from agriculture and mining to transport and communications. It is interesting to note, however, that the Latin American countries also tended to invest a higher proportion of GDP in machinery and transport equipment; the averages for this category in the later period of the decade were 9.5 per cent in Latin America, 7.5 per cent in Asia and 7.1 per cent in Africa. Fifteen of the 18 Latin American countries listed in table 37 invested more than 7 per cent of GDP in machinery and transport equipment (see table 41). By comparison, table 41 indicates that only 8 out of 16 Asian countries and 7 out of 15 African countries spent in excess of 7 per cent of GDP on this type of

[68] Wherever possible the periods covered 1960—1962 and 1966—1968. For some countries, however, data were available only for other years of the decade.

TABLE 37. FIXED CAPITAL FORMATION BY TYPE OF CAPITAL GOOD AS PER CENT OF GDP IN 18 LATIN AMERICAN COUNTRIES[a]

	Period	Total fixed capital formation	Construction and works			Machinery and equipment		
			Land and dwellings	Non-residential buildings	Other construction and works	Transport equipment	Machinery	Machinery plus transport equipment
Argentina	1960—1962	24.5		9.4		4.9	10.2	15.1
	1966—1968	20.5		9.2		4.3	7.0	11.3
Bolivia[b]	1960—1962	17.2	0.8	0.4	5.5	...	...	10.5
	1966—1968	20.4	2.4	0.5	7.0	...	...	10.5
Chile[c]	1961—1963	21.1	3.8	2.8	6.3	...	...	8.2
	1966—1968	19.0	3.4	2.4	4.9	...	...	8.3
Colombia	1960—1962	19.7	4.6	1.2	4.4	2.9	6.6	9.5
	1965—1967	17.1	4.1	0.6	4.9	1.9	5.6	7.5
Costa Rica[d]	1960—1962	21.5	6.6	5.4		3.0	6.5	9.5
	1965—1967	23.2	5.3	5.1		3.8	9.0	12.8
Dominican Republic[b]	1960—1962	8.5		5.6		1.4	1.5	2.9
	1966—1968	14.3		9.0		2.2	3.1	5.3
El Salvador[d]	1960—1962	13.2	2.8	0.4	3.0	...	...	7.0
	1965—1967	16.2	2.2	0.5	3.8	...	...	9.7
Guatemala[b]	1960—1962	10.1	2.3	2.4		...	...	5.4
	1966—1968	12.3	2.4	2.3		...	...	7.6
Guyana[d,e]	1963—1964	16.0	0.6	5.0		...	...	10.4
	1966—1967	26.4	0.3	9.5		...	...	16.6
Honduras	1960—1961	12.4	3.7	1.9	2.6	...	...	4.2
	1963—1964	15.4	3.8	2.0	3.4	...	...	6.2

Jamaica[a]	1960—1962	21.5	3.6	4.9	2.3	1.6	9.1	10.7
	1965—1967	23.0	3.7	5.1	3.3	1.9	9.0	10.9
Nicaragua[b]	1960—1962	13.4	2.0	1.4	1.9	...	...	8.1
	1966—1968	18.8	1.8	2.5	2.8	...	...	11.7
Panama	1960—1962	17.7	3.6	3.7	2.3	2.5	5.6	8.1
	1966—1968	22.1	4.5	4.5	2.1	3.3	7.7	11.0
Paraguay[b]	1962—1964	11.0		5.7		1.9	3.4	5.3
	1966—1968	15.5		7.4		2.5	5.6	8.1
Peru[f]	1960—1961	18.1		8.7		...	...	9.4
	1962—1963	19.9		8.4		...	...	11.5
Puerto Rico	1960—1962	21.2	5.8	8.4		...	...	7.0
	1966—1968	24.7	7.6	9.6		...	...	7.5
Uruguay	1960—1961	17.0		11.1		...	...	5.9
	1962—1963	17.2		8.6		...	...	8.6
Venezuela[b]	1960—1962	14.9	1.8	7.9		2.1	3.1	5.2
	1966—1968	17.0	3.2	8.4		2.6	2.8	5.4
Average for first period		16.6	...	...	...	2.5	5.8	7.9
Average for second period		19.1	...	...	...	2.8	6.2	9.5

Source: United Nations, *Yearbook of National Accounts Statistics, 1969*, Vol. I.
[a] Data are based on GDP at constant factor cost and fixed capital formation by type of capital good at constant market prices.
[b] GDP at constant market prices.
[c] Percentage of net domestic product.
[d] GDP at current factor cost, fixed capital formation at current market prices.
[e] Dwellings are included in non-residential buildings and other construction.
[f] Percentage of gross national product at constant market prices.

TABLE 38. FIXED CAPITAL FORMATION BY TYPE OF CAPITAL GOOD AS PER CENT OF GDP IN 16 ASIAN COUNTRIES[a]

	Period	Fixed capital formation	Construction and works			Machinery and equipment		
			Land and dwellings	Non-residential buildings	Other construction and works	Transport equipment	Machinery	Machinery plus transport equipment
Ceylon[b]	1960—1962	15.0	1.2	6.4	2.6	1.4	3.4	4.8
	1966—1968	14.8	1.4	7.1	3.0	0.9	2.4	3.3
China (Taiwan)	1960—1962	14.5		7.7		1.5	5.3	6.8
	1966—1968	21.0		8.8		2.4	9.8	12.2
Cyprus	1960—1962	18.3	6.2	2.0	2.4	1.9	5.8	7.7
	1966—1968	20.6	6.6	3.0	2.4	2.0	6.6	8.6
Indonesia[c,d]	1960—1962	9.8		5.7		...	...	4.1
	1966—1968	8.0		4.4		...	...	3.6
Iran[e]	1960—1962	14.7		9.5		...	...	5.2
	1965—1967	17.4		11.4		...	...	6.0
Iraq	1960—1962	20.5	4.0	2.9	8.1	1.7	3.8	5.5
	1966—1968	16.4	3.0	2.0	5.7	1.4	4.3	5.7
Jordan[e]	1960—1962	18.3	5.8	1.0	5.5	1.7	4.3	6.0
	1966—1968	17.0	3.7	0.7	8.4	1.6	2.6	4.2
Khmer Republic[e]	1962—1963	18.9	6.9	3.5	3.7	1.8	3.0	4.8
	1965—1966	16.1	5.4	1.3	5.0	1.3	3.1	4.4
Korea, Republic of	1960—1962	12.3	2.0	2.4	3.2	1.3	3.4	4.7
	1966—1968	26.9	2.5	4.7	6.7	4.8	8.2	13.0

Lebanon[c]	1964—1965	23.8		15.7		...	...	8.1
	1966—1967	23.1		15.4		...	...	7.7
Malaysia[e]	1960—1962	17.5	2.2	2.6	6.8	...	...	5.9
	1964—1966	19.2	2.1	3.7	7.0	...	...	6.4
Philippines[f]	1960—1962	14.0		7.0		...	...	7.0
	1966—1968	18.8		9.6		...	...	9.2
Singapore[e]	1960—1962	9.6	2.3	1.2	1.5	0.9	3.7	4.6
	1966—1968	15.4	3.4	2.2	2.4	1.1	6.3	7.4
Syrian Arab Republic	1964—1965	18.4	3.6	1.9	3.4	2.4	7.1	9.5
	1966—1968	19.9	3.0	1.5	4.1	2.5	8.8	11.3
Thailand[c]	1960—1962	16.3	2.8	5.7		2.5	5.3	7.8
	1965—1967	24.5	2.1	10.8		3.9	7.7	11.6
Viet-Nam, Republic of[c]	1960—1962	9.5		3.6		1.3	4.6	5.9
	1963—1965	9.3		3.2		1.6	4.5	6.1
Average for first period		15.7	...	...	...	1.7	4.5	6.2
Average for second period		18.0	...	...	...	2.1	5.8	7.5

Source: United Nations, *Yearbook of National Accounts Statistics, 1969*, Vol. I.
[a] Data are based on GDP at constant factor cost and fixed capital formation by type of capital good at constant market prices.
[b] Dwellings are included in non-residential buildings.
[c] GDP at constant market prices.
[d] Gross domestic capital formation.
[e] GDP at current factor cost, fixed capital formation at current market prices.
[f] Percentage of net domestic product.

TABLE 39. FIXED CAPITAL FORMATION BY TYPE OF CAPITAL GOOD AS PER CENT OF GDP IN 15 AFRICAN COUNTRIES[a]

	Period	Fixed capital formation	Construction and works			Machinery and equipment		
			Land and dwellings	Non-residential buildings	Other construction and works	Transport equipment	Machinery	Machinery plus transport equipment
Ethiopia[b]	1961—1963	12.5		9.2		...	...	3.3
	1965—1967	13.5		9.3		...	...	4.2
Ghana[c]	1960—1962	19.2		9.2	3.8	3.1	3.1	6.2
	1966—1968	12.3		5.1	3.1	1.3	2.8	4.1
Ivory Coast[b]	1960—1962	17.3		10.9		2.3	4.1	6.4
	1964—1966	21.4		11.9		2.7	6.8	9.5
Kenya	1964—1965	13.6	2.7	1.5	2.3	2.7	4.4	7.1
	1967—1968	18.7	3.3	2.3	3.3	3.7	6.1	9.8
Libyan Arab Republic[d]	1962—1964	29.0	10.3	10.0		...	...	8.7
	1966—1968	24.6	4.7	12.1		...	...	7.8
Malawi[e]	1960—1961	16.3	...	12.0	0.3	...	...	4.0
	1962—1963	12.7	...	8.6	0.4	...	...	3.7
Mauritius[b]	1960—1962	25.4	9.0	2.9	4.9	2.7	5.9	8.6
	1966—1968	17.0	4.3	2.9	3.2	2.5	4.1	6.9
Morocco[e]	1960—1962	11.9	...	3.1	4.4	...	...	4.4
	1966—1968	14.3	...	3.1	5.9	...	...	5.3

Nigeria[f]	1960—1962	10.6	1.6	3.5	2.2	0.7	2.6	3.3
	1964—1966	12.5	2.0	3.3	2.6	1.1	3.5	4.6
Sierra Leone	1963—1965	14.4	3.3	0.5	3.4	3.1	4.1	7.2
	1966—1968	14.9	3.8	0.6	3.6	2.6	4.3	6.9
Southern Rhodesia[e]	1964—1965	12.4		6.4		...	...	6.0
	1967—1968	13.4		7.4		...	...	6.0
Tanzania, United Rep. of[b]	1960—1962	12.6	4.3		3.6	1.6	3.1	4.7
	1965—1967	16.8	4.7		4.1	3.4	4.6	8.0
Togo[b]	1963—1964	13.9	3.7		3.0	...	...	7.2
	1965—1966	17.4	5.2		3.5	...	...	8.7
Tunisia[b]	1960—1962	21.9	2.7	12.1		1.9	5.2	7.1
	1965—1967	29.6	2.7	16.5		1.6	8.8	10.4
Zambia[e]	1964—1965	16.9		10.6		...	...	6.3
	1966—1968	23.4		12.4		...	...	11.0
Average for first period		16.5	...	...	...	2.3	4.1	6.0
Average for second period		17.5	...	...	...	2.4	5.1	7.1

Source: United Nations, *Yearbook of National Accounts Statistics, 1969*, Vol. I.

[a] Data are based on GDP at constant factor cost and fixed capital formation by type of capital good at constant market prices.
[b] GDP at current factor cost, fixed capital formation at current market prices.
[c] GDP and fixed capital formation at current market prices.
[d] Dwellings are included in non-residencial buildings and other construction.
[e] GDP at constant market prices.
[f] Dwellings are included in non-residential buildings.

TABLE 40. FREQUENCY DISTRIBUTION OF COUNTRIES BY PER CENT OF GDP DEVOTED TO FIXED CAPITAL FORMATION[a]

Per cent	*Number of countries*		
	Latin America	*Asia*	*Africa*
28.0—32.9	0	0	1
23.0—27.9	3	3	2
18.0—22.9	7	5	2
13.0—17.9	7	6	7
8.0—12.9	1	2	3
Total	18	16	15

[a] Percentages are for the later period indicated for countries listed in tables 37, 38 and 39.

TABLE 41. FREQUENCY DISTRIBUTION OF COUNTRIES BY PER CENT OF GDP INVESTED IN MACHINERY AND TRANSPORT EQUIPMENT[a]

Per cent	*Number of countries*		
	Latin America	*Asia*	*Africa*
13.0 and over	1	1	0
11.0—12.9	5	3	1
9.0—10.9	3	1	3
7.0— 8.9	6	3	3
5.0— 6.9	3	4	4
3.0— 4.9	0	4	4
Total	18	16	15

[a] Percentages are for the later period indicated for countries listed in tables 37, 38 and 39.

capital good. This generally higher investment in machinery and transport equipment reflects the higher degree of industrialization in Latin America as well as the greater mechanization of the agricultural sector in this region.[69]

The data for Latin America are encouraging with respect to this region's over-all prospects for economic growth and more rapid growth in the manufacturing sector. The ratio of fixed capital formation to GDP decreased in only three countries—Argentina, Chile and Colombia. The most spectacular increases in this proportion were recorded in the Dominican Republic and Guyana. Argentina and Colombia were the only two countries in table 37 to record a fall in the proportion of GDP invested in machinery and transport equipment. If an increase in this proportion is a necessary prerequisite for an acceleration in the growth rate of the manufacturing sector, most Latin American countries met this condition.

The data for Asia reveal the greatest variations in investment as a percentage of GDP (see table 38). In Indonesia, only 8 per cent of GDP was allocated to

[69] The next section of this chapter considers the relative importance of manufacturing in Latin American, Asian and African countries. Chapter V, "Industry and Agriculture in Economic Development", presents some data on the relative levels of mechanization in the agricultural sectors of the three regions.

fixed capital formation in the second period, 1966–1968, and the comparable figure for the Republic of Viet-Nam was 9.3 per cent, for 1963–1965. The lowest figure in the other two regions was 12.3 per cent for both Guatemala and Ghana. The most marked improvement in the ratio of investment to GDP in Asia was recorded in the Republic of Korea; this country's fixed capital formation grew from 12.3 per cent of GDP in 1960–1962 to 26.9 per cent in 1966–1968. Other noteworthy increases in this proportion occurred in China (Taiwan), Singapore and Thailand. Seven of the 16 Asian countries recorded a drop in the proportion of fixed capital formation to GDP, though in no case was the decline substantial. The proportion of GDP invested in machinery and transport equipment declined in only 5 of these countries and increased in 11 of them. Only one half of the Asian countries, however, invested over 7 per cent of GDP in machinery and transport equipment in the second period (see table 41).

African countries evidenced the lowest average level of investment. Only 5 of the 15 countries listed in table 39 invested more than 18 per cent of GDP in fixed capital formation (see table 40). A hopeful sign for the future, however, is that a majority of these countries were increasing the proportion of investment to GDP. The biggest increase in investment took place in Tunisia where, in 1965–1967, the percentage of GDP devoted to fixed capital formation reached the exceptionally high level of almost 30 per cent. In the mid-1960s Tunisia experienced a boom in non-residential building and other construction activities, with 16.5 per cent of GDP devoted to these two categories alone. This figure is considerably larger than that for any other developing country.

It is also informative to examine the relative importance of the different types of investment included in the total spending on fixed capital. Although this information is implicit in tables 37, 38 and 39, it is explicitly stated for easy reference in tables 42, 43 and 44. The distribution indicates the relative emphasis placed on each type of investment independent of the magnitude of total capital spending in the country. The periods shown for each country correspond to those in the earlier tables. Table 45 summarizes these data, giving the frequency distribution of countries by the percentage of fixed capital formation devoted to machinery and transport equipment in each developing region.

In Latin America, the distribution of investment among the different types of capital good follows a broadly similar pattern in most countries (see table 42). In the later period of the First Development Decade, on the average, one half of fixed capital formation was devoted to machinery and transport equipment and one half to construction and works, that is, to land improvements, dwellings, non-residential buildings and other construction. It is evident that Latin American countries typically allocated a higher proportion of fixed capital formation to machinery than the countries of the other two developing regions. This is understandable since the industrial sector in Latin America is markedly larger relative to the non-industrial sector than it is in the other regions, and agriculture and trade are also more highly mechanized. Thus, in 15 of the 18 countries listed in table 42 more than 40 per cent of the fixed capital formation was devoted to machinery and transport (see table 45).

TABLE 42. PER CENT DISTRIBUTION OF FIXED CAPITAL FORMATION, BY TYPE OF CAPITAL GOOD, FOR 18 LATIN AMERICAN COUNTRIES[a]

	Period	Construction and works			Machinery and equipment		
		Land and dwellings	Non-residential buildings	Other construction and works	Transport equipment	Machinery	Machinery plus transport equipment
Argentina	1960—1962		38.5		19.9	41.6	61.5
	1966—1968		44.9		21.2	33.9	55.1
Bolivia	1960—1962	4.3	2.5	32.2	...	...	61.0
	1966—1968	11.9	2.3	34.3	...	...	51.5
Chile	1961—1963	18.0	13.4	29.8	...	...	38.8
	1966—1968	17.7	12.8	26.0	...	...	43.5
Colombia	1960—1962	23.1	6.1	22.5	15.0	33.3	48.3
	1965—1967	23.9	3.5	28.7	11.2	32.7	43.9
Costa Rica	1960—1962	30.6	25.5		13.8	30.1	43.9
	1965—1967	22.9	22.2		16.2	38.7	54.9
Dominican Republic	1960—1962		66.1		16.9	17.0	33.9
	1966—1968		63.2		15.5	21.3	36.8
El Salvador	1960—1962	21.5	2.9	22.8	...	...	52.8
	1965—1967	13.8	3.1	23.3	...	...	59.8
Guatemala	1960—1962	22.7	24.2		...	...	53.1
	1966—1968	19.2	18.9		...	...	61.9
Guyana[b]	1963—1964	3.8	31.0		...	...	65.2
	1966—1967	1.3	36.0		...	...	62.7

Honduras	1960—1961	30.1	15.1	20.6	...	...	34.2
	1963—1964	25.1	12.9	21.8	...	...	40.2
Jamaica	1960—1962	16.9	22.8	10.6	7.6	42.1	49.7
	1965—1967	16.2	22.3	14.5	8.0	39.0	47.0
Nicaragua	1960—1962	14.7	10.4	14.1	...	...	60.8
	1966—1968	9.7	13.4	14.6	...	...	62.3
Panama	1960—1962	20.0	20.9	13.1	14.1	31.9	46.0
	1966—1968	20.5	20.5	9.7	14.7	34.6	49.3
Paraguay	1962—1964		51.9		17.4	30.7	48.1
	1966—1968		47.8		16.4	35.8	52.2
Peru	1960—1961		48.1		...	...	51.9
	1962—1963		42.4		...	...	57.6
Puerto Rico	1960—1962	27.3	39.7		...	...	33.0
	1966—1968	30.7	39.0		...	...	30.3
Uruguay	1960—1961		65.4		...	...	34.6
	1962—1963		50.0		...	...	50.0
Venezuela	1960—1962	12.1	52.8		14.0	21.1	35.1
	1966—1968	18.6	49.5		15.5	16.4	31.9
Average for first period					14.8	31.0	47.3
Average for second period					14.8	31.6	49.5

Source: UNIDO, based on United Nations, *Yearbook of National Accounts Statistics, 1969*, Vol. I.
[a] Based on data at constant market prices, except for Costa Rica, El Salvador, Guyana and Jamaica, which use data at current market prices.
[b] Dwellings are included in non-residential buildings and other construction.

TABLE 43. PER CENT DISTRIBUTION OF FIXED CAPITAL FORMATION, BY TYPE OF CAPITAL GOOD, FOR 16 ASIAN COUNTRIES[a]

	Period	Construction and works			Machinery and equipment		
		Land and dwellings	Non-residential buildings	Other construction and works	Transport equipment	Machinery	Machinery plus transport equipment
Ceylon[b]	1960—1962	7.8	42.9	17.6	9.2	22.5	31.7
	1966—1968	9.6	48.1	20.1	5.8	16.4	22.2
China (Taiwan)	1960—1962		53.0		10.5	36.5	47.0
	1966—1968		42.1		11.4	46.5	57.9
Cyprus	1960—1962	33.7	11.1	12.8	10.6	31.8	42.4
	1966—1968	31.9	14.6	11.7	9.6	32.2	41.8
Indonesia[c]	1960—1962		58.3		...	...	41.7
	1966—1968		54.5		...	...	45.5
Iran	1960—1962		64.6		...	...	35.4
	1965—1967		65.7		...	...	34.3
Iraq	1960—1962	19.4	14.3	39.5	8.4	18.4	26.8
	1966—1968	18.3	12.0	34.9	8.5	26.3	34.8
Jordan	1960—1962	31.9	5.5	29.7	9.4	23.5	32.9
	1966—1968	21.5	4.4	49.5	9.2	15.4	24.6
Khmer Republic	1962—1963	36.6	18.3	19.5	9.8	15.8	25.6
	1965—1966	33.3	8.0	31.1	8.0	19.6	27.6
Korea, Republic of[d]	1960—1962	15.8	19.7	26.1	10.9	27.5	38.4
	1966—1968	9.3	17.6	24.8	17.7	30.6	48.3

Lebanon	1964—1965		66.1		...	...	33.9
	1966—1967		66.5		...	...	33.5
Malaysia	1960—1962	12.3	15.0	38.9	...	...	33.8
	1964—1966	11.0	19.2	36.5	...	...	33.3
Philippines	1960—1962		50.1		...	...	49.9
	1966—1968		51.3		...	...	48.7
Singapore	1960—1962	23.8	12.8	15.0	9.7	38.7	48.4
	1966—1968	21.9	14.4	15.4	7.5	40.8	48.3
Syrian Arab Rep.	1963—1965	19.7	10.3	18.4	12.9	38.7	51.6
	1966—1968	15.3	7.3	20.5	12.5	44.4	56.9
Thailand	1960—1962	17.1	34.7		15.5	32.7	48.2
	1965—1967	8.7	44.2		15.7	31.4	47.1
Viet-Nam, Rep. of	1960—1962		37.4		13.7	48.9	62.6
	1963—1965		34.4		17.7	47.9	65.6
Average for first period					11.0	30.5	40.6
Average for second period					11.2	32.0	41.9

Source: UNIDO, based on United Nations, *Yearbook of National Accounts Statistics, 1969*, Vol. I.

[a] Based on data at constant market prices, except for Iran, Jordan, the Khmer Republic, Lebanon, Malaysia, Singapore and the Republic of Viet-Nam, which use data at current market prices.

[b] Dwellings are included in non-residential buildings.

[c] Gross domestic capital formation.

[d] Land is included in dwellings and other construction.

TABLE 44. PER CENT DISTRIBUTION OF FIXED CAPITAL FORMATION, BY TYPE OF CAPITAL GOOD, FOR 15 AFRICAN COUNTRIES[a]

	Period	Construction and works			Machinery and equipment		
		Land and dwellings	Non-residential buildings	Other construction and works	Transport equipment	Machinery	Machinery plus transport equipment
Ethiopia	1961—1963		73.3		...	...	26.7
	1965—1967		69.2		...	...	30.8
Ghana	1960—1962	48.3		19.7	16.0	16.0	32.0
	1966—1968	41.7		25.1	10.2	23.0	33.2
Ivory Coast	1960—1962		63.1		13.4	23.5	36.9
	1964—1966		55.9		12.5	31.6	44.1
Kenya	1964—1965	19.5	11.1	16.6	20.1	32.7	52.8
	1967—1968	17.6	12.4	17.4	19.9	32.7	52.6
Libyan Arab Rep.[b]	1962—1964	35.6	34.3		...	...	30.1
	1966—1968	19.0	49.3		...	...	31.7
Malawi[c]	1960—1961	...	73.6	1.6	...	...	24.8
	1962—1963	...	67.7	2.9	...	...	29.4
Mauritius	1960—1962	35.4	11.5	19.2	10.7	23.2	33.9
	1966—1968	25.3	16.9	18.9	14.6	24.3	38.9
Morocco[c]	1960—1962	...	25.8	36.9	...	...	37.3
	1966—1968	...	21.5	41.6	...	...	36.9

Nigeria[c]	1960—1962	15.0	33.2	20.9	6.7	24.2	30.9
	1964—1966	15.8	26.2	20.9	9.3	27.8	37.1
Sierra Leone	1963—1965	23.1	3.4	23.3	21.5	28.7	50.2
	1966—1968	25.7	3.8	24.2	17.6	28.7	46.3
Southern Rhodesia[d]	1960—1962		60.7		...	...	39.3
	1966—1968		54.9		...	...	45.1
Tanzania, United	1960—1962		34.0	28.6	12.5	24.9	37.4
Republic of	1965—1967		28.1	24.4	19.9	27.6	47.5
Togo	1963—1964		26.4	21.8	...	...	51.8
	1965—1966		29.8	20.0	...	...	50.2
Tunisia	1960—1962	12.1	55.4		8.7	23.8	32.5
	1965—1967	9.1	55.7		5.5	29.7	35.2
Zambia	1964—1965		62.8		...	...	37.2
	1966—1968		53.0		...	...	47.0
Average for first period					13.7	24.6	36.9
Average for second period					13.7	28.2	40.4

Source: UNIDO, based on United Nations, *Yearbook of National Accounts Statistics, 1969*, Vol. I.

[a] Based on data at constant market prices, except for Ethiopia, Ghana, Ivory Coast, Mauritius, Togo, Tunisia and the United Republic of Tanzania, which use data at current market prices.

[b] Dwellings are included in non-residential buildings and other construction.

[c] Dwellings are included in non-residential buildings.

[d] The data for 1960—1962 are at 1954 market prices; and for 1966—1968, at 1965 market prices.

TABLE 45. FREQUENCY DISTRIBUTION OF COUNTRIES BY PER CENT OF FIXED CAPITAL FORMATION DEVOTED TO MACHINERY AND TRANSPORT EQUIPMENT[a]

Per cent	Number of countries		
	Latin America	Asia	Africa
60.0 and over	3	1	0
50.0—59.9	7	2	2
40.0—49.9	5	6	5
30.0—39.9	3	4	7
20.0—29.9	0	3	1
Total	18	16	15

[a] Percentages are for the later period indicated for countries listed in tables 42, 43 and 44.

The change in this proportion over time may reflect the change in the climate and opportunities for industrial investment and the emphasis placed on industry in government policy making. Information on investment in machinery alone was available for only eight Latin American countries. Half of these countries showed an increase in the proportion of fixed capital formation allocated to machinery. The largest increase in this proportion was in Costa Rica, while Argentina recorded the largest decrease. Eleven of the 18 countries experienced an increase in the percentage of fixed capital formation devoted to machinery and transport equipment combined. Taking this percentage as an indicator of the emphasis placed on manufacturing, it is evident that major shifts in favour of manufacturing investment occurred in Costa Rica, El Salvador, Guatemala, Honduras, Peru and Uruguay. Of these, Costa Rica maintained a high over-all investment level, while the level in the other countries was more moderate.[70]

As it does for total investment, the distribution of fixed capital formation by type of capital good shows more variation in the Asian developing countries than in Africa and Latin America. The percentages of fixed capital devoted to machinery in the second period of the decade in the Asian countries included both the highest and the lowest figure of the three regions. For the Republic of Viet-Nam, the relevant percentage was 47.9 per cent, and the figures for China (Taiwan), Singapore and the Syrian Arab Republic were close behind.[71] At the other extreme, the figure for Jordan was only 15.4 per cent.

A similar pattern emerges when the amount of fixed capital formation devoted to machinery and transport equipment together is considered. In the Republic of Viet-Nam, 65.6 per cent of the fixed capital formation was devoted to these two types of capital good in the second period, in this case 1963—1965; this was the highest percentage observed for the three regions. In three Asian

[70] See table 37. It should be noted that the data for Honduras, Peru and Uruguay are limited to 1960—1964. As will be demonstrated later in this chapter, these shifts in the composition of investment are not always reflected in the pattern of manufacturing output.

[71] The Republic of Viet-Nam had a low over-all level of investment (see table 38).

countries, Ceylon, Jordan and the Khmer Republic, less than 30 per cent of fixed capital was invested in machinery and transport equipment in the second period; all three had a lower percentage of investment in this category than any country in Latin America and Africa.

As regards the direction of change over the First Development Decade, substantial increases in the percentage of fixed capital allocated to machinery and transport equipment were made in China (Taiwan), Iraq and the Republic of Korea. These Asian countries appear to have experienced the greatest changes in the structure of their economies in favour of industry (among the countries listed in table 43). Otherwise, however, fewer than half of the countries in the sample—only 7 of the 16—increased the proportion of fixed capital devoted to machinery and transport equipment over the two periods considered.[72]

African countries recorded the lowest average share of fixed capital formation allotted to machinery and transport equipment. This is indicative of the generally lower level of industrial development in this region and of the heavier emphasis on investment in infrastructure. The African countries show the greatest similarity in the percentage of fixed capital devoted to machinery and transport equipment. Over the second period, 12 of the 15 countries invested between 30 and 50 per cent of fixed capital in this type of capital good (see table 45).

An encouraging observation concerning African industrialization is that none of the eight African countries with relevant data experienced a decline in the proportion of capital formation allocated to machinery. Only 4 of the 15 countries listed in table 44 reduced the proportion of fixed capital invested in machinery and transport equipment over the two periods, and in no case was the reduction substantial. The largest decline was observed for Sierra Leone, which, however, registered one of the highest percentages of fixed capital formation invested in machinery and transport equipment. In the United Republic of Tanzania and Zambia the allocation of investment shifted substantially in favour of machinery and transport equipment.

INVESTMENT AND INDUSTRIALIZATION

The pace of industrialization can be measured in two ways. The usual way is to consider the actual rate at which the industrial sector is growing. However, to compare the physical growth of the industrial sector of various countries requires data at constant market prices, and these are available for only a few developing countries. An alternative way to measure the pace of industrialization is to ascertain for each country the rate at which the share of manufacturing in GDP is increasing or decreasing. An advantage of this approach is that the number of countries covered may be expanded substantially by including those for which data on manufacturing and GDP exist only at current prices. (The

[72] In the case of Iraq, however, the change in the proportion might be misleading, because it represents a rather modest growth of investment in machinery and transport measured against slow growth in total fixed capital formation (see table 36). The share of fixed capital formation in GDP actually dropped over the period, while that of machinery and transport equipment rose only slightly (table 38).

TABLE 46. CHANGE IN SHARE OF MANUFACTURING VALUE ADDED IN GDP, AND OF MACHINERY AND TRANSPORT EQUIPMENT IN FIXED CAPITAL FORMATION, FOR 18 LATIN AMERICAN COUNTRIES
(Per cent)

	Period	Manufacturing output		Change in share of machinery and transport equipment in fixed capital formation[c]
		Share of GDP[a]	Change in share of GDP[b]	
Argentina	1960—1962	32.4		
	1966—1968	34.7	2.3	—6.4
Bolivia[d]	1960—1962	13.7		
	1966—1968	15.2	1.5	—9.5
Chile[e]	1961—1963	24.9		
	1966—1968	26.9	2.0	4.7
Colombia	1960—1962	16.8		
	1965—1967	17.5	0.7	—4.4
Costa Rica[f g]	1960—1962	15.5		
	1965—1967	16.4	0.9	11.0
Dominican Republic[d]	1960—1962	17.2		
	1966—1968	16.2	—1.0	2.9
El Salvador[f]	1960—1962	16.2		
	1965—1967	19.1	2.9	7.0
Guatemala[d]	1960—1962	13.1		
	1966—1968	15.3	2.2	8.8
Guyana[f]	1963—1964	13.3		
	1966—1967	12.3	—1.0	—2.5
Honduras	1960—1961	13.0		
	1963—1964	14.3	1.3	6.0
Jamaica[f]	1960—1962	13.8		
	1965—1967	15.1	1.3	—2.7
Nicaragua[f]	1960—1962	10.5		
	1966—1968	14.3	3.8	1.5
Panama	1960—1962	13.9		
	1966—1968	16.6	2.7	3.3
Paraguay[d]	1962—1964	16.0		
	1966—1968	16.2	0.2	4.1
Peru[d h]	1960—1961	16.7		
	1962—1963	17.3	0.6	5.7
Puerto Rico	1960—1962	23.0		
	1966—1968	25.2	2.2	—2.7
Uruguay	1960—1961	22.6		
	1962—1963	22.3	—0.3	15.4
Venezuela[d]	1960—1962	13.0		
	1966—1968	14.8	1.8	—3.2
Unweighted average for first period		17.0		
Unweighted average for second period		18.3	1.3	2.2
Latin American region	1960—1962	23.3		
	1966—1968	23.9	0.6	...

Source: UNIDO, based on United Nations, *Yearbook of National Accounts Statistics*, 1969, Vol. I.
[a] At constant factor cost.
[b] Second period percentage minus first period percentage.
[c] From table 42, defined as second period minus first period.
[d] At constant market prices.
[e] Manufacturing as a percentage of net domestic product.
[f] At current factor cost.
[g] Manufacturing includes mining and quarrying.
[h] Manufacturing as a percentage of gross national product.

TABLE 47. CHANGE IN SHARE OF MANUFACTURING VALUE ADDED IN GDP, AND OF MACHINERY AND TRANSPORT EQUIPMENT IN FIXED CAPITAL FORMATION, FOR 16 ASIAN COUNTRIES

(Per cent)

	Period	Manufacturing output		Change in share of machinery and transport equipment in fixed capital formation[c]
		Share of GDP[a]	Change in share of GDP[b]	
Ceylon	1960—1962	4.9		
	1966—1968	8.9	4.0	—9.5
China (Taiwan)[d]	1960—1962	17.4		
	1966—1968	21.9	4.5	10.9
Cyprus	1960—1962	12.7		
	1966—1968	11.9	—0.8	—0.6
Indonesia[e]	1960—1962	9.0		
	1966—1968	8.8	—0.2	3.8
Iran[d]	1960—1962	8.9		
	1965—1967	11.2	2.3	—1.1
Iraq	1960—1962	9.7		
	1966—1968	8.8	—0.9	8.0
Jordan[d,f]	1960—1962	7.7		
	1966—1968	11.1	3.4	—8.3
Khmer Republic[d,g]	1962—1963	19.2		
	1965—1966	19.0	—0.2	2.0
Korea, Rep. of	1960—1962	13.6		
	1966—1968	20.6	7.0	9.9
Lebanon[d,f]	1964—1965	14.1		
	1966—1967	14.1	0.0	—0.4
Malaysia[d]	1960—1962	8.5		
	1964—1966	10.3	1.8	—0.5
Philippines[h]	1960—1962	17.8		
	1966—1968	17.4	—0.4	—1.2
Singapore[d]	1960—1962	7.8		
	1966—1968	11.5	3.7	—0.1
Syrian Arab Rep.[i]	1963—1965	12.0		
	1966—1968	13.5	1.5	5.3
Thailand[e]	1960—1962	11.5		
	1965—1967	14.0	2.5	—1.1
Viet-Nam, Rep. of[d]	1960—1962	11.1		
	1963—1965	11.1	0.0	3.0
Unweighted average for first period		11.6		
Unweighted average for second period		13.4	1.8	1.3
Asian Region	1960—1962	13.2		
	1966—1968	14.9	1.7	...

Source: UNIDO, based on United Nations, *Yearbook of National Accounts Statistics, 1969*, Vol. I.

[a] At constant factor cost.
[b] Second period percentage minus first period percentage.
[c] From table 43, defined as second period minus first period.
[d] At current factor cost.
[e] At constant market prices.
[f] Manufacturing includes mining and quarrying.
[g] Manufacturing includes mining, quarrying, construction, electricity, gas and water.
[h] Manufacturing as a percentage of net domestic product.
[i] Manufacturing includes mining quarrying, electricity, gas and water.

TABLE 48. CHANGE IN SHARE OF MANUFACTURING VALUE ADDED IN GDP, AND OF MACHINERY AND TRANSPORT EQUIPMENT IN FIXED CAPITAL FORMATION, FOR 14 AFRICAN COUNTRIES[a]
(Per cent)

	Period	Manufacturing output		Change in share of machinery and transport equipment in fixed capital formation[d]
		Share of GDP[b]	Change in share of GDP[c]	
Ethiopia[e]	1961—1963	6.4		
	1965—1967	7.6	1.2	4.1
Ivory Coast[e]	1960—1962	7.7		
	1964—1966	8.9	1.2	7.2
Kenya	1964—1965	10.4		
	1967—1968	9.9	—0.5	—0.2
Libyan Arab Rep.	1962—1964	3.8		
	1966—1968	2.4	—1.4	1.6
Malawi[e]	1960—1961	5.9		
	1962—1963	5.4	—0.5	4.6
Mauritius[e]	1960—1962	15.5		
	1966—1968	15.2	—0.3	5.0
Morocco[f]	1960—1962	13.8		
	1966—1968	13.8	0.0	—0.4
Nigeria	1960—1962	5.1		
	1964—1966	5.7	0.6	6.2
Sierra Leone	1963—1965	5.9		
	1966—1968	6.2	0.3	—3.9
Southern Rhodesia[e]	1960—1962	16.6		
	1966—1968	18.3	1.7	5.8
Tanzania, the United Rep. of[e]	1960—1962	3.4		
	1965—1967	5.3	1.9	10.1
Togo[e]	1963—1964	4.5		
	1965—1966	8.6	4.1	—1.6
Tunisia[e, g]	1960—1962	13.7		
	1965—1967	14.9	1.2	2.7
Zambia[e]	1964—1965	6.7		
	1966—1968	9.6	2.9	9.8
Unweighted average for first period		8.5	0.9	3.6
Unweighted average for second period		9.4	0.9	3.6
African region	1960—1962	7.3		
	1966—1968	8.5	1.2	...

Source: UNIDO, based on United Nations, *Yearbook of National Accounts Statistics, 1969*, Vol. I.
[a] Ghana is not included since data on the share of manufacturing in GDP were not available.
[b] At constant factor cost.
[c] Second period percentage minus first period percentage.
[d] From table 44, defined as second period minus first period.
[e] At current factor cost.
[f] At constant market prices.
[g] Manufacturing includes fishing and excludes basic metals industry.

assumption must be made that price changes in manufacturing and in the rest of the economy are roughly equal.)

Tables 46, 47 and 48 give country data on the change in the share of manufacturing value added in GDP over the First Development Decade. The time periods and the countries covered correspond to those in tables 37, 38 and 39

TABLE 49. FREQUENCY DISTRIBUTION OF COUNTRIES BY THEIR SHARE OF MANUFACTURING VALUE ADDED IN GDP[a]

Per cent	*Number of countries*		
	Latin America	*Asia*	*Africa*
30.0—34.9	1	0	0
25.0—29.9	2	0	0
20.0—24.9	1	2	0
15.0—19.9	10	2	2
10.0—14.9	4	9	2
5.0— 9.9	0	3	9
0.0— 4.9	0	0	1
Total	18	16	14

[a] Percentages are for the later period indicated for countries listed in tables 46, 47 and 48.

and 42, 43 and 44, with the exception of Ghana.[73] These tables also indicate the change in the share of fixed capital formation allocated to investment in machinery and transport equipment (or, by implication, to investment in manufacturing), so that it may be seen whether this is related to change in the share of manufacturing in GDP.

For the Latin American countries shown in table 46 the average share of manufacturing in GDP was 18.3 per cent in the second period. This share was well in excess of the corresponding value for Asia (table 47). The comparative underdevelopment of manufacturing in Africa (table 48) is shown clearly by the fact that on the average less than 10 per cent of GDP was generated by manufacturing. The difference in the stages of industrialization reached by the three developing regions may be seen clearly from table 49, which gives the distribution of countries by their share of manufacturing value added in GDP over the second period indicated in tables 46, 47 and 48. In 14 of the 18 Latin American countries, manufacturing accounted for at least 15 per cent of GDP. However, the share of manufacturing exceeded 15 per cent in only 4 of the 16 Asian countries, and in only 2 of the 14 African countries. An interesting feature, evident from table 49, is that the manufacturing sectors for the majority of countries within each region tend to be approximately the same size. Thus, the share of manufacturing in GDP for 10 of the 18 Latin American countries was between 15 and 19.9 per cent; for 9 of the 16 Asian countries it was between 10 and 14.9 per cent; and for 9 of the 14 African countries it was between 5 and 9.9 per cent.

The growth of industrialization, measured as an increasing share of manufacturing in GDP, was widespread in Latin America in the First Development Decade. In the first period indicated, the unweighted average share of manufacturing in GDP for the countries listed in table 46 was 17 per cent; this share had risen to 18.3 in the second period. The share of manufacturing in GDP declined in only three countries—the Dominican Republic, Guyana and Uruguay,

[73] Ghana is not included in the African countries listed in table 48 since data on the share of manufacturing in GDP were not available.

and in each case the reduction was slight.[74] The aggregated data for the entire Latin American region, however, show that the share of manufacturing increased from 23.3 per cent of GDP in the 1960–1962 period to only 23.9 per cent in 1966–1968. This reflects the fact that the large South American countries, which fared least well over the decade, weigh heavily in the aggregate figures. For the 16 Asian countries listed in table 47, manufacturing as a percentage of GDP averaged 11.6 per cent at the beginning of the decade; this figure had risen to 13.4 per cent in the second period. If the aggregated figures for the entire Asian region are taken together, manufacturing accounted for 13.2 per cent of GDP in 1960–1962 and for 14.9 per cent in 1966–1968. For the majority of the African countries also, manufacturing output increased as a percentage of GDP (see table 48). Libya was the only country to experience a substantial decline in this ratio. For Africa as a whole, the average share of manufacturing increased from 8.5 per cent of GDP in the first period to 9.4 per cent in the second period. The aggregate figures indicate that manufacturing accounted for only 7.3 per cent of GDP in 1960–1962 and for 8.5 per cent in 1966–1968, implying that the larger African countries tend to have relatively smaller manufacturing sectors.

If a Government wishes to accelerate the rate of industrialization as defined here (i.e. the increase of the share of manufacturing in GDP), it could be argued that it must increase the proportion of total investment allocated to the manufacturing sector. This hypothesis may be evaluated on the basis of the data in tables 46, 47 and 48, taking the share of investment in machinery and transport equipment as a proxy variable for the share of investment in manufacturing.

Except for Africa, the data show no evidence that the change in the share of manufacturing in GDP is related to the change in the share of machinery and transport equipment in fixed capital formation. For the Latin American countries listed in table 46, the correlation coefficient between these two variables is −0.13. The country showing the largest shift in the structure of investment in favour of machinery and transport equipment was Uruguay, which is one of the countries where manufacturing output as a percentage of GDP declined. The largest increase in manufacturing output as a percentage of GDP occurred in Nicaragua, but it was accomplished by only a marginal shift in the structure of investment in favour of machinery and transport equipment. Six countries—Argentina, Bolivia, Colombia, Jamaica, Puerto Rico and Venezuela—recorded an increase in the manufacturing component of GDP over a period when the share of machinery and transport equipment in fixed capital formation was declining.

A similar pattern was evident for the developing countries of Asia (see table 47). China (Taiwan) and the Republic of Korea, the two countries with the largest growth in the share of manufacturing in GDP, also experienced the largest shifts in the structure of investment in favour of machinery and transport equipment. However, Ceylon and Jordan were the only two countries to record a substantial shift in the structure of investment away from these two types of

[74] Normal or even rapid growth in these countries may be obscured in these data by exceptionally rapid development in some non-manufacturing sectors. This seems to have been the case especially in the Dominican Republic and Guyana.

capital good, and yet these countries also registered a substantial gain in manufacturing as a percentage of GDP. For all countries in table 47 taken together, the correlation coefficient between the change in the share of manufacturing in GDP and the change in the share of machinery and transport equipment in fixed capital formation is only 0.05.

Africa differs from the other regions in that there is some statistical correlation for the countries shown in table 48 between the change in the relative importance of manufacturing as a component of GDP and the change in the structure of investment. The over-all picture for these African countries is complicated, however, by the situation in Togo, which experienced the largest gain in the share of manufacturing in GDP and at the same time a decided shift away from investment in machinery and transport equipment as a component of fixed capital formation. The next largest gains in manufacturing as a percentage of GDP occurred in the United Republic of Tanzania and Zambia where on the contrary there were substantial shifts in the structure of investment in favour of machinery and transport equipment. At the other extreme, for three countries that show a reduction in the share of machinery and transport equipment in fixed capital formation—namely, Kenya, Morocco and Sierra Leone—the share of manufacturing in GDP remained approximately constant. If Togo is excluded, a significant positive correlation coefficient (0.65) between the two rates of change exists for these African countries.

The conclusion from the above analysis is that the encouragement of industrialization requires more than a shift of investment in favour of machinery and transport equipment, or, that is, in favour of the manufacturing sector. In some countries the manufacturing sector has grown faster than the rest of the economy at a time when this sector appears to have been receiving a constant or declining share of the total investment. In such cases, there may be spare capacity in the manufacturing sector from investment undertaken in earlier periods, and the growth in manufacturing output may take place because of favourable changes in other factors. Among the more important of these other factors would be the growth of demand either from the domestic market or from overseas, the greater availability of persons with the necessary skills to operate the machinery, and the increased availability of necessary inputs for the manufacturing sector. Investments in infrastructure may also facilitate manufacturing. By contrast, in some countries investment has been concentrated in manufacturing only to create spare capacity; and the output of the manufacturing sectors has not grown as rapidly as other parts of the economy because the other necessary conditions have not been favourable.

THE FLOW OF EXTERNAL FINANCE, INCLUDING FOREIGN PRIVATE INVESTMENT, TO DEVELOPING COUNTRIES

As indicated in table 50, the net flow of resources reaching the developing countries from all sources increased from 1960–1968 at a compound rate of 6 per cent per annum.[75] The most significant increase over this period took

[75] The net flow is defined here as new capital inflow minus outflow of capital, interest and profits stemming from pre-existing investments.

TABLE 50. NET FINANCIAL FLOWS TO DEVELOPING COUNTRIES FROM EXTERNAL SOURCES[a]

Average annual disbursement, net

Source	Net financial flow (million dollars)			Per cent of total			Average annual growth rate (per cent)
	1960–1962	1966–1968	1969	1960–1962	1966–1968	1969	1960–1968
DAC member countries	7,813	10,679	12,160	93	89	89	5.4
Other industrialized countries[b]	5	12	23	—	—	—	15.7
Centrally planned economies	300	342	300	3	3	2	2.2
Multilateral agencies	315	916	1,160	4	8	9	19.5
Total net flows to developing countries	8,433	11,949	13,643	100	100	100	6.0

Source: UNIDO, based on OECD, *Development Assistance: 1970 Review*, Paris, 1970, table II-2, p. 31.

[a] Net of repatriation of capital, interest and profits stemming from earlier flows.

[b] Including Finland and New Zealand.

place in the flows through multilateral agencies. Such flows increased during the First Development Decade to more than three times their initial level. Another noteworthy feature indicated in table 50 is that the countries of the Development Assistance Committee (DAC) were directly responsible for about 90 per cent of all aid reaching the developing countries.[76]

Table 51 breaks down the disbursements from DAC countries to the developing countries and multilateral agencies into those from official and private sources. Private capital flows expanded most rapidly, growing at an average annual rate of 8.2 per cent in the period 1960–1968. From 1960 to 1962 private capital accounted for 34 per cent of the net flow from DAC countries. This increased to 40 per cent in 1966–1968 and to 46 per cent in 1969.

Unfortunately, precise data indicating the proportion of this private capital invested in manufacturing are not available. Some of the largest concentrations of foreign private investment are devoted to the exploitation of natural resources such as oil, copper and bauxite. However, there is clear evidence that manufacturing is taking an increasing share. This is especially true of private investments from the United States, which amounted to over one half of the total private investments received by the developing countries in 1968.[77] In the late 1950s, hardly more than 10 per cent of net capital outflow from the United States to the developing countries was invested in manufacturing. In the first six years of the First Development Decade, this percentage had risen to approximately 40 per cent.[78]

Unfortunately, no current statistics are available on the flow of private capital to individual countries. Tables 52, 54 and 56 show the total and *per capita* net receipts of foreign private capital by Latin American, Asian and African countries for 1965–1967, the most recent period for which information exists.[79] This capital was very unevenly distributed. In Latin America, one country—Mexico—received 30 per cent of the combined receipts of the 23 countries listed in table 52. Brazil, Mexico and Venezuela together received well over one half of the total private foreign capital flowing into Latin America in the 1965–1967 period. Nigeria was the largest African recipient, accounting for over one half of the total foreign private capital invested in the 15 countries listed in table 56. In Asia, the Republic of Korea was the most important recipient over this period (see table 54).

[76] The DAC countries are also the original source of some of the funds reaching developing countries from the multilateral agencies. The DAC group of countries consists of Australia, Austria, Belgium, Canada, Denmark, France, the Federal Republic of Germany, Italy, Japan, the Netherlands, Norway, Portugal, Sweden, the United Kingdom and the United States.

[77] See UNIDO, *Industrial Development Survey*, Vol. II, p. 94.

[78] Percentages calculated from UNIDO, *Industrial Development Survey*, Vol. I, table 70, p. 202.

[79] Net receipts of foreign private capital are defined here as: foreign direct investment and loans received (net of repayments), including loans to local governments and private monetary institutions; and changes in long-term liabilities (arising, for example, from transactions in existing bond issues of developing countries). The return flow of interest and profits is not yet deducted. See United Nations, *The External Financing of Economic Development—International Flow of Long-Term Capital and Official Donations, 1963—1967* (Sales No.: 69.II.D.10), p. 63.

TABLE 51. NET FLOW OF OFFICIAL AND PRIVATE RESOURCES FROM DAC COUNTRIES TO DEVELOPING COUNTRIES AND TO MULTILATERAL AGENCIES [a]

Average annual disbursement, net

	Net flow (million dollars)			*Share of total official and private flows (per cent)*			*Average annual growth rate (per cent)*
	1960–1962	*1966–1968*	*1969*	*1960–1962*	*1966–1968*	*1969*	*1960–1968*
Net official resources	5,714	6,929	7,291	66	60	54	3.3
Private capital	2,903	4,661	6,280	34	40	46	8.2
Total	8,617	11,590	13,571	100	100	100	5.1

Source: UNIDO, based on OECD, *Development Assistance: 1970 Review*, Paris, 1970, table II-1, p. 30.
[a] Net of repatriation of capital, interest and profits stemming from earlier flows.

TABLE 52. TOTAL AND PER CAPITA NET RECEIPTS OF FOREIGN PRIVATE CAPITAL BY LATIN AMERICAN COUNTRIES, 1965—1967[a]

	Total net receipts (million dollars)	*Population in mid-1966 (thousands)*	*Per capita receipts (dollars)*
Argentina	1	22,897	0.0
Bolivia	22	4,446	4.9
Brazil	434	83,890	5.2
Chile	—47	8,922	—5.3
Colombia	209	18,596	11.2
Costa Rica	104	1,541	67.5
Dominican Republic	25	3,754	6.7
Ecuador	66	5,326	12.4
El Salvador	58	3,037	19.1
Guatemala	88	4,575	19.2
Haiti	3	4,486	0.7
Honduras	26	2,256	11.5
Jamaica	144	1,839	78.3
Mexico	907	44,145	20.5
Netherlands Antilles	—16	210	—76.2
Nicaragua	76	1,720	44.2
Panama[b]	43	1,287	33.4
Paraguay	37	2,094	17.7
Peru	190	12,012	15.8
Surinam	57	350	162.9
Trinidad and Tobago	114	995	114.6
Uruguay	19	2,749	6.9
Venezuela	344	9,030	38.1
Total	2,904	240,157	12.1

Source: UNIDO, based on United Nations, *The External Financing of Economic Development—International Flow of Long-Term Capital and Official Donations 1963—1967*, table 24, pp. 61—63; and *Monthly Bulletin of Statistics*, May 1971.

[a] Net receipts of foreign private capital are defined as: foreign direct investment and loans received (net of repayments), including loans to local governments and private monetary institutions; and changes in other long-term liabilities (arising, for example, from transactions in existing bond issues of developing countries). The return flow of interest and profits is not deducted.

[b] Population does not include Canal Zone.

TABLE 53. DISTRIBUTION OF PER CAPITA RECEIPTS OF FOREIGN PRIVATE CAPITAL, AND OF POPULATION IN LATIN AMERICA, 1965—1967[a]

Per capita receipts (dollars)	*Number of countries*	*Total receipts (million dollars)*	*Per cent of total receipts*	*Population (thousands)*	*Per cent of total population*
Less than 0.0	2	—63	—2.2	9,132	3.8
0.0— 4.9	3	26	0.9	31,829	13.3
5.0— 9.9	3	478	16.5	90,393	37.6
10.0—19.9	7	674	23.2	47,896	19.9
20.0—49.9	4	1,370	47.2	56,182	23.4
50.0—99.9	2	248	8.5	3,380	1.4
100.0 and over	2	171	5.9	1,345	0.6
Total	23	2,904	100.0	240,157	100.0

[a] Derived from table 52.

TABLE 54. TOTAL AND PER CAPITA NET RECEIPTS OF FOREIGN PRIVATE CAPITAL BY ASIAN COUNTRIES, 1965—1967[a]

	Total net receipts (million dollars)	*Population in mid-1966 (thousands)*	*Per capita receipts (dollars)*
Burma	—	25,246	—
Ceylon	—5	11,439	—0.4
China (Taiwan)	192	12,811	15.0
India[b]	36	498,703	0.1
Indonesia	—18	107,431	—0.2
Iran	271	25,543	10.6
Jordan	4	1,974	2.0
Korea, Republic of	409	29,086	14.1
Malaysia	206	8,298	24.8
Pakistan	195	117,000	1.7
Philippines	—7	33,477	—0.2
Saudi Arabia	217	6,870	31.6
Singapore	45	1,914	23.5
Syrian Arab Republic	—14	5,384	—2.6
Thailand	154	31,698	4.9
Viet-Nam, Republic of	—7	16,543	—0.4
Total	1,678	933,417	1.8

Source: UNIDO, based on United Nations, *The External Financing of Economic Development – International Flow of Long-Term Capital and Official Donations 1963–1967*, table 42, pp. 61–63; and *Monthly Bulletin of Statistics*, May 1971.

[a] Net receipts of foreign private capital are defined as: foreign direct investment and loans received (net of repayments), including loans to local governments and private monetary institutions, and changes in other long-term liabilities (arising, for example, from transactions in existing bond issues of developing countries). The return flow of interest and profits is not deducted.

[b] Population includes data for part of Jammu and Kashmir, whose final status has not yet been determined.

TABLE 55. DISTRIBUTION OF PER CAPITA RECEIPTS OF FOREIGN PRIVATE CAPITAL, AND OF POPULATION IN ASIA, 1965—1967[a]

Per capita receipts (dollars)	*Number of countries*	*Total receipts (million dollars)*	*Per cent of total receipts*	*Population (thousands)*	*Per cent of total population*
Less than 0.0	5	—51	—3.0	174,274	18.7
0.0— 4.9	5	389	23.2	674,621	72.3
5.0— 9.9	—	—	—	—	—
10.0—19.9	3	872	52.0	67,440	7.2
20.0—49.9	3	468	27.8	17,082	1.8
Total	16	1,678	100.0	933,417	100.0

[a] Derived from table 54.

Total capital flows, considered by country, do not necessarily give the best indication of the distribution of foreign private investment. For most purposes it is more informative to consider the *per capita* receipts; these are also given in tables 52, 54 and 56. For example Surinam, with less than 2 per cent of the total net private capital inflow into Latin American countries, received the largest *per capita* amount in the period 1965—1967. The next highest *per capita* receipts also went to relatively small countries, namely, Costa Rica, Jamaica, Nicaragua, and Trinidad and Tobago. In fact, all these Latin American countries had greater

TABLE 56. TOTAL AND PER CAPITA NET RECEIPTS OF FOREIGN PRIVATE CAPITAL BY AFRICAN COUNTRIES, 1965—1967[a]

	Total net receipts (million dollars)	*Population in mid-1966 (thousands)*	*Per capita receipts (dollars)*
Egypt	—11	30,139	—0.4
Ethiopia	46	23,143	2.0
Ghana	130	7,945	16.4
Ivory Coast	44	3,920	11.2
Kenya	36	9,643	3.7
Libyan Arab Republic[b]	—128	1,677	—76.3
Malawi	11	4,025	2.7
Morocco	19	13,725	1.4
Nigeria	439	59,951	7.3
Sierra Leone	36	2,403	15.0
Somalia	6	2,560	2.3
Sudan	6	14,120	0.4
Tanzania, Republic of	17	11,962	1.4
Tunisia	164	4,716	34.8
Zambia	16	3,826	4.2
Total	831	193,755	4.3

Source: UNIDO, based on United Nations, *The External Financing of Economic Development—International Flow of Long-Term Capital and Official Donations 1963—1967*, table 24, pp. 61—63; and *Monthly Bulletin of Statistics*, May 1971.

[a] Net receipts of foreign private capital are defined as: foreign direct investment and loans received (net of repayments), including loans to local governments and private monetary institutions; and changes in other long-term liabilities (arising, for example, from transactions in existing bond issues of developing countries). The return flow of interest and profits is not deducted.

[b] *De jure* population.

per capita receipts than the highest figures observed for the other two regions. Table 53 indicates the extent to which the Latin American countries with small populations received higher *per capita* levels of foreign private capital. The 4 countries with *per capita* receipts in excess of $50 had only 2 per cent of the total population of the 23 countries, and they received 14.4 per cent of the total foreign private investment. The 8 countries with *per capita* receipts in excess of $20 received 61.6 per cent of the total private capital, although their populations amounted to only 25.4 per cent of the total for the countries listed.

In Asia, Malaysia, Saudi Arabia and Singapore received the highest *per capita* amounts of foreign private investment. In terms of population these are small countries, especially when compared to India, Indonesia and Pakistan. The latter countries recorded low *per capita* levels of private foreign investment, and, as a result, the over-all *per capita* figure for the region was low, only $1.80 or 15 per cent of the comparable figure for Latin America and 42 per cent of that for Africa.[80] Table 55 shows that the receipts of foreign private capital

[80] India, Indonesia and Pakistan received a net total of $213 million in foreign private investment in 1965—1967 with a combined population in 1966 of 723 million. The total value of receipts of foreign private investment in the developing countries of Latin America, Asia and Africa listed in tables 52, 54 and 56 was $5,413 million, and the combined population of these countries was 1,367 million. Thus, India, Indonesia and Pakistan accounted for over 50 per cent of the combined population of developing countries but received only 4 per cent of the foreign private investment.

TABLE 57. DISTRIBUTION OF PER CAPITA RECEIPTS OF FOREIGN PRIVATE CAPITAL, AND OF POPULATION IN AFRICA, 1965—1967*

Per capita receipts (dollars)	*Number of countries*	*Total receipts (million dollars)*	*Per cent of total receipts*	*Population (thousands)*	*Per cent of total population*
Less than 0.0	2	—139	—16.7	31,816	16.4
0.0— 4.9	8	157	18.9	83,004	42.8
5.0— 9.9	1	439	52.8	59,951	31.0
10.0—19.9	3	210	25.3	14,268	7.4
20.0—49.9	1	164	19.7	4,716	2.4
Total	15	831	100.0	193,755	100.0

* Derived from table 56.

were more unequally distributed in Asia than in the other two regions. Five countries, Ceylon, Indonesia, the Philippines, the Syrian Arab Republic and the Republic of Viet-Nam, had a net outflow of private capital. These countries accounted for 18.7 per cent of the total population of the 16 countries listed. Burma had a value of zero for net receipts of private capital, and 4 other countries had *per capita* receipts of less than $5.00. At the other extreme, the 6 countries with *per capita* receipts in excess of $10 accounted for 9 per cent of the total population of these countries but received almost 80 per cent of the total foreign private investment. To some extent, particularly in Asia, the uneven distribution of foreign private investment may be offset by a compensating apportionment of foreign official capital.

In terms of *per capita* receipts of foreign private investment, Tunisia ranked highest for African countries with *per capita* receipts of $34.80. The next largest amounts were $16.40 for Ghana and $15.00 for Sierra Leone. It was noted earlier in this chapter that in Tunisia an exceptionally high percentage of GDP was devoted to investment in building and construction in the mid-1960s. This additional evidence suggests that this activity was financed largely by foreign capital. The four African countries with the highest *per capita* receipts—45.0 per cent of the total receipts of foreign private capital for Africa—accounted for only 9.8 per cent of the combined population (see table 57). The distribution of *per capita* receipts of foreign private investment in Africa was heavily influenced by the large outflow of such capital from Libya. To conclude, it is clear that within the three developing regions the distribution of net private capital flows is by no means proportional to country size as measured by population.

Chapter V

INDUSTRY AND AGRICULTURE IN ECONOMIC DEVELOPMENT

It has become increasingly obvious to many observers that an effort to promote economic development should not rely too heavily on a single sector of the economy. While a major push concentrated in either the agricultural or industrial sector may not be certain to fail, for most countries the chance of marked success appears slight. Acceptance of the premise that integrated development of industry and agriculture is desirable suggests other points of inquiry. If higher growth rates result from the collaboration of the two sectors than from concentration on one, what is the process whereby each sector depends upon the other and both grow stronger? To understand this process and ultimately to help in guiding policy and strategy decisions, it is useful to explore existing intersectoral relationships and, where possible, to postulate others that might be advantageous. The purpose of this chapter is to examine some of the characteristics of the present and potential relationships between agriculture and industry.

Historical perspective on the economic transformation

Economic development both requires and results in a major transformation in the structure of the economy. The nature of this structural change must be affected at least in part by the linkages and points of contact between the agricultural sector, which has been influenced by long-term historical forces, and the industrial sector, which is shaped by forces of more recent origin. Although these major sectors differ in their final products, in their production methods, and, generally, in the size of their economic units, they are nevertheless closely related.

An examination of the structural transformation that took place over a long period in the developed market economies affords some useful generalizations on intersectoral relationships. From the course of historical development it may be seen that the change in the economic structure is characterized by a substantial decline in the relative contribution of agriculture to total output. Table 58 contains data on changes in the proportion of national product originating in the agricultural, industrial and services sectors for selected developed market economies. It is notable that for some the share of agriculture in total output was as high in the period immediately preceding the start of sustained

TABLE 58. LONG-RUN CHANGES IN THE SHARE OF MAJOR SECTORS IN NATIONAL PRODUCT FOR SELECTED DEVELOPED MARKET ECONOMIES

(Per cent)

	Agriculture	*Industry*	*Services*
France (GDP)			
1896	25.0	46.2	28.8
1963	8.4	51.0	40.6
Great Britain (NDP)[a]			
1801—1811	34.1	22.1	43.8
1907	6.4	38.9	54.7
Italy (GDP)			
1861—1870	54.3	20.3	25.4
1963—1967	13.1	47.4	39.8
Japan (NDP)			
1879—1883	62.5	37.5	
1963—1967	11.9	45.3	42.8
Netherlands (national income)			
1913	18.8	36.8	44.4
1963—1967	8.0	49.9	42.1
Sweden (GDP)			
1861—1870	38.3	22.6	39.1
1963—1967	6.5	54.5	39.0
United States (national income)			
1839	42.6	25.8	31.6
1889—1899	17.9	44.1	38.0

Source: Simon Kuznets, *Economic Growth of Nations*, pp. 144—151.
[a] The industrial sector excludes and the services sector includes transport, storage and communication.

growth as that now exhibited by some developing countries; for example, in Italy in the 1860s, the United States in the 1840s and Japan in the 1880s agriculture contributed from 40 to 60 per cent of total output.[81] For most of the present developed market economies, the share of agriculture in output has declined to 10 per cent or less, and accompanying that change has been a marked rise in the shares attributable to industry and to the services sector. The typical gain for industry appears to be from a base of around 20 to 25 per cent early in the growth process to from 45 to 60 per cent as maturity is reached.

In the process of economic transformation a decline in the relative importance of agricultural output and a rise in that of industry are accompanied by somewhat parallel changes in the labour force for the two sectors. Table 59 contains data on changes in the proportion of the labour force engaged in agriculture, industry and the services sector for the same selected developed market economies shown in table 58. The proportion of the labour force employed in agriculture prior to the acceleration of industrialization was quite high, ranging from 34 per cent in Great Britain to about 85 per cent in the United States and

[81] With the exception of Japan, however, these countries at the time had a *per capita* product of at least $200 (1958 prices). The currently developing countries, having this same proportion of output originating in agriculture, are more likely to exhibit *per capita* product in the range of $50 to $100. (Simon Kuznets, *Economic Growth of Nations*, The Belknap Press, Cambridge, England, 1971, p. 152.)

TABLE 59. LONG-RUN CHANGES IN THE SHARE OF MAJOR SECTORS IN THE LABOUR FORCE FOR SELECTED DEVELOPED MARKET ECONOMIES

(Per cent)

	Agriculture	*Industry*	*Services*
France			
1856	51.7	28.5	19.8
1962	20.0	43.6	36.4
Great Britain			
1801—1811[a]	34.4	30.0	35.6
1907	6.4	38.9	54.7
Italy			
1861—1871	57.5	25.8	16.7
1964	25.2	46.4	28.4
Japan			
1872	85.8	5.6	8.6
1920	54.6	25.4	20.0
1964	27.6	37.2	35.0
Netherlands			
1849	45.4	29.4	25.2
1960	11.0	50.5	38.5
Sweden			
1860	64.0	18.8	17.2
1960	13.8	52.7	33.5
United States			
1810	83.7	16.3	
1929	21.2	38.0	40.8
1965	5.7	38.0	56.3

Source: Simon Kuznets, *Economic Growth of Nations*, pp. 250–254.

[a] The industrial sector excludes and the services sector includes transport, storage and communication.

Japan. The rapid decline in the share of agriculture in the labour force was matched by increased shares for both industry and services.

As evident from the data in table 60, in several developing countries the trend towards economic transformation appears similar to the historical experience of the developed market economies. This is especially the case with the relative sectoral contribution to GDP, wherein the importance of agriculture has declined and that of industry and services has increased. For most developing countries, however, the transformation in the labour force has tended to lag well behind the transformation in output. India, for example, has experienced no decline over the past century in the proportion of the labour force engaged in agriculture. Early in the 1960s, in the Philippines over 60 per cent of the labour force was employed in agriculture, in Thailand more than 80 per cent, and in Pakistan more than 70 per cent.[82] In Latin America, the proportion of the labour force in agriculture in 1965 was 44.5 per cent while the proportion of total product originating in this sector was only 21.8 per cent.[83]

[82] ECAFE, *Economic Survey of Asia and the Far East, 1964* (Sales No.: 65.II.F.1), p. 8.

[83] ECLA, *The Economic Development of Latin America in the Postwar Period* (Sales No.: 64.II.G.6), p. 30; *The Process of Industrialization in Latin America*, Stat. Annex, pp. 13, 17; *Economic Survey of Latin America, 1965* (Sales No.: 67.II.G.1), p. 20; *Economic Survey of Latin America*, 1968.

TABLE 60. CHANGES IN THE SHARE OF MAJOR SECTORS IN GDP AT CURRENT FACTOR COST FOR SELECTED DEVELOPING COUNTRIES

(Per cent)

	Agriculture, forestry, hunting and fishing	*Industry*[a]	*Services*[b]
Argentina			
1955—1956	16.24	47.88[c]	38.50
1967—1968	14.91	50.83[c]	34.26
Ceylon			
1955—1956	52.27	18.96	28.77
1967—1968	38.52	27.50	33.98
China (Taiwan)			
1955—1956	33.20	31.27	35.71
1967—1968	23.42	37.02	40.04
Colombia			
1955—1956	37.45	29.95	32.60
1967—1968	30.61	32.32	37.07
Ecuador			
1955—1956	36.49	26.87	36.64
1967—1968	32.35	28.87	38.78
Iraq			
1955—1956	18.95	58.69	22.36
1967—1968	19.86	52.53	27.55
Kenya			
1955—1956	42.26	24.01	33.67
1967—1968	35.38	27.36	37.11
Korea, Republic of			
1955—1956	46.96	17.83	35.21
1967—1968	33.54	31.74	34.70
Mauritius			
1955—1956	31.56	39.12	29.32
1967—1968	23.74	37.53	38.67
Mexico[d]			
1955—1956	21.08	36.57	42.52
1966—1967	16.16	40.50	43.39
Morocco[e]			
1955—1956	32.70	25.82[f]	41.48[g]
1967—1968	32.82	27.05[f]	40.13[g]
Peru[h]			
1955—1956	21.22	26.67[f]	52.11[g]
1967—1968	17.55	30.93[f]	51.48[g]
Philippines			
1955—1956[i]	39.03	22.00	38.97
1967—1968[j]	33.98	26.89	39.13
Southern Rhodesia			
1955—1956	21.55	41.17	37.23
1967—1968	17.63	42.57	39.77

TABLE 60 *(continued)*

	Agriculture, forestry hunting and fishing	*Industry*[a]	*Services*[b]
Tanzania, United Republic of			
1955—1956	62.39	21.87	15.75
1967—1968	50.62	18.13	31.19
Thailand[k]			
1955—1956	41.17	23.16	35.67
1967—1968	30.51	28.67	40.81
Trinidad and Tobago			
1955—1956	15.69	52.88	31.43
1967—1968	8.21	68.40	23.35

Source: United Nations, *Yearbook of National Accounts Statistics, 1966*, Vol. I (Sales No.: 66.XVII.2), and *1969*, Vol. I (Sales No.: 71.XVII.2).

[a] "Industry" here includes mining and quarrying, manufacturing, construction, electricity, gas and water, and transport, storage and communication.

[b] "Services" here includes wholesale and retail trade, banking, insurance and real estate, ownership of dwellings, public administration and defence.

[c] Excludes storage.

[d] At market prices of 1950.

[e] Gross domestic product at market prices of 1960.

[f] Transport, storage and communication are included under heading "Services".

[g] "Services" includes transport, storage and communication.

[h] Gross national product at market prices of 1963.

[i] Net national product = national income.

[j] Net domestic product.

[k] At current market prices.

Further, the decline that has occurred in the relative importance of the agricultural labour force generally has not been matched by a corresponding rise in the industrial labour force. Rather employment in the services sector has tended to expand over time. Historically, the disproportionate growth of the labour force in the services sector has followed a rapid expansion of the industrial labour force. In many developing countries, however, and especially in those with rapid population growth, the relative growth of employment in services has accompanied or even preceded the expansion of industrial employment. Where there has been substantial population growth, both agriculture and services have tended to become residual employment sectors, whereas the level of industrial employment is a function of such technical considerations as capital-labour coefficients and the level of investments. Population growth often results in more family members per hectare of family farm land. This is especially the case where industrial employment is not growing rapidly enough to absorb a large proportion of new entrants to the labour force. In urban areas many new entrants to the labour force are forced into self-employment in marginal activities.

By the use of cross-country data Professor Simon Kuznets has estimated the shares in GDP and in the labour force of agriculture, industry and the services sector at several stages of growth, as shown in table 61. His findings indicate that rising *per capita* income is accompanied by a structural transformation in

TABLE 61. ESTIMATED SHARES OF MAJOR SECTORS IN GDP AND IN TOTAL LABOUR FORCE AT VARIOUS LEVELS OF GROWTH

Bench-mark value of 1958 per capita GDP[a] *(dollars)*	*Share of sectors in GDP*			*Share of sectors in labour force*		
	Agriculture	*Industry (per cent)*	*Services*	*Agriculture*	*Industry (per cent)*	*Services*
70	48.4	20.6	31.0	80.3	9.2	10.5
150	36.8	26.3	36.9	63.7	17.0	19.3
300	26.4	33.0	40.6	46.0	26.9	27.1
500	18.7	40.9	40.4	31.4	36.2	32.4
1,000	11.7	48.4	39.9	17.7	45.3	37.0

Source: Simon Kuznets, *Economic Growth of Nations*, pp. 111 and 203.

[a] The bench-mark values of *per capita* GDP were selected by ranking *per capita* GDP for 57 countries and using a moving average on groups. Shares were then estimated by simple interpolation.

both the productive capacity and the labour force. Although the data used in the estimates are for 1958, the income and product relationships should still pertain. As *per capita* GDP grows, the proportion contributed by agriculture should decline unless the economy is closely tied to primary exports and industrialization is not a goal. The estimated shares for the labour force, however, may be less valid now. Most new entrants to the labour force in 1958 were born prior to 1945, so that the rate of growth of the labour force in 1958 was closely determined by the growth rate of population 15 or more years earlier. For many if not most developing countries the growth rate of population has increased steadily since the Second World War. The rising population growth rate is reflected in the rate of growth in the labour force. Since the current growth rates of the labour force exceed the rates shown in table 61, it is likely that the proportion of employment in agriculture is now declining more slowly than in 1958. This would occur if agriculture were a residual employment sector.

Several reasons may be advanced to explain why sustained economic growth leads to a seemingly inevitable decline in the relative importance of agriculture and a rise in industrial importance. The more usual explanation stresses the long-term effects of income elasticities of demand. Demand for agricultural products generally exhibits a relatively low income elasticity, while the demand for industrial products is generally more elastic. This phenomenon is implicit in Engel's law, which holds that as incomes rise a growing proportion of expenditures is for non-food products. In the developing countries, the income elasticity of demand for food is higher than it is in the developed countries, but still lower than that for manufactures, and, as in the developed countries, it falls as income rises. In terms of a national economy, therefore, sustained economic growth results in a relatively rapid rate of growth of demand for industrial products and a slower rate of growth of demand for food and fibre. To the extent that this pattern of demand is catered to by domestic production, a parallel transformation results in the national product.

Empirical studies tend to support these generalizations. They show an income elasticity of demand for food in the developed countries of around

0.2,[84] and of approximately 0.6 in the developing countries, although there is considerable scatter in these measurements depending on the commodity group in question.[85] The implication of these coefficients is that the long-term growth of consumption of food beyond a certain basic level is limited more than that of other consumer goods by cultural considerations, human needs and other factors affecting individual preference patterns.[86]

There are certainly other factors that explain in part the growing preponderance of the non-agricultural sectors. For example, the increased specialization of production processes which is characteristic of economic development tends to decrease the relative role of agriculture through transferring many non-agricultural activities—processing or marketing for example—from farms to the industrial and services sectors. In addition, product development over time frequently has increased the proportion of manufacturing value added (MVA) built upon a given value of agricultural inputs. For example, with the growth in importance of so-called "convenience foods", MVA per unit of industrial output grows relative to the value of the primary inputs.

Data on cotton consumption indicate that the growth of demand for agriculturally produced textile fibres may be no more dynamic than that for food products. Between 1953–1955 and 1964 global *per capita* consumption of all textile fibres grew from 4.5 to 5.2 kilograms; however, total *per capita* consumption of cotton did not grow, remaining at 3.1 kilograms.[87] This lag in the growth of *per capita* consumption for cotton is largely explained by the substitution of man-made fibres for cotton. Over the decade 1955–1964, the share of cotton in total consumption of textile fabrics fell by 8.4 percentage points while that of man-made fibres expanded by almost one half. Thus the income elasticity of demand for cotton is significantly lower than that for textile fibres.

It may easily be argued that the transformation of the labour force ensues

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[84] A coefficient of 0.2 indicates that a 1 per cent growth of income results in a 0.2 per cent growth in demand for food.

[85] U.S. Department of Agriculture, Economic Research Service, *Elasticity of Food Consumption*, by Robert D. Stevens, Foreign Agricultural Report No. 23, Government Printing Office, Washington, D.C., 1965.

[86] It is sometimes argued, especially in academic circles, that such a transformation in consumption patterns is not a necessity for sustained economic growth, that the fruits of an industrial economy can be imported with foreign exchange earned through the growth of primary exports. While this possibility may be admitted, it is certain that the conditions of world demand would not permit such an engine of growth for a substantial number of developing countries. Since Engel's law may be expected to hold true on a global basis as well, the world market for manufactures should grow at a more rapid rate than the market for food products. The implication for export-oriented economies is therefore obvious: in general, the better long-run prospects for growth tend to lie in manufacturing.

It may be noted further that if a country should achieve growth without economic transformation, it probably would not develop a services sector (including education) to the extent found in industrialized economies. Services, communication and transport develop to a large degree as adjuncts to industry and may simultaneously or at some later stage be diversified to become directly consumer services.

[87] For this period *per capita* consumption of cotton in the developed market economies remained stable at 5.9 kilograms; in the centrally planned economies it grew from 2.8 to 2.9 kilograms; and in the developing countries it grew from 1.8 to 1.9 kilograms. (J. Sinclair, *The Production, Marketing and Consumption of Cotton*, Praeger, London, 1968, p. 47.)

from the transformation of output. As industrial products and services activities come to dominate the output mix of a particular country, it might be expected that these sectors would also account for the preponderance of employment. The transformation in output has advanced more rapidly, however, than the transformation in the labour force. Several reasons may be advanced for the differential in these rates of change. Much of the growth in industrial output is accounted for by growth in productivity, whereas the debilitating effects of poverty, traditional techniques and inhibitory cultural patterns have tended to retard the introduction of more productive methods into the agricultural sector. The techniques used in agriculture have therefore remained relatively labour intensive. Also, agriculture tends to be a residual employment sector, while employment in industry is more strictly dependent on technical considerations.

The foregoing generalizations are interesting from an historical viewpoint, and they may indicate the pattern of future development. They may also explain the tendency to identify economic progress with industrial development. They do not clarify, however, the effectual relationships between agriculture and industry. The following discussion examines the actual and potential causal relationships between agriculture and industry.

The macro-economic relationships between agriculture and industry

In addition to the links between agriculture and industry involving the cross-sectoral flows of products, there are other interrelationships that are more easily understood with the aid of macro-economic analysis. These concern the intersectoral flows of capital and labour which are at the same time both the cause and effect of the process of transforming an economy from one dominated by traditional agriculture into one with the major features of a modern industrial society. Briefly, economists usually argue that in the early phases of development both capital and labour must flow from the agricultural sector to industry if this transformation is to take place.

The transfer of resources between sectors

At the beginning of the economic transformation national output originates predominantly in the agricultural sector and most of the labour force is occupied there. The critical element in the transformation is capital formation in the non-agricultural sectors, especially in industry. If it is assumed that no significant inflow of foreign capital occurs, the initial impetus of the transformation clearly will require financing by the agricultural sector. There are several possible avenues for channelling funds from agricultural to the non-agricultural sectors[88]:

[88] In addition to the three possibilities indicated, the sale to the agricultural sector of manufactured inputs and services such as transportation also transfers funds to non-agricultural sectors.

(1) Investments in non-farm activities, using resources drawn from agriculture;
(2) Taxation of agriculture combined with public investment in industry;
(3) Deterioration of agriculture's intersectoral terms of trade.

If the initial stages of the transformation are to take place strictly on the basis of private decisions within the context of a market economy, the growth of the non-agricultural sectors must depend largely on private savings accumulated in the agricultural sector and invested by the agriculturists themselves or by financial institutions in other sectors. Included in this category would be the formation of farmer co-operatives. It is common, however, even in market economies, to supplement private capital flows to industry with resources drawn from taxes assessed on land, incomes or output, which necessarily weigh most heavily on agriculture, the largest sector. Tax revenues are often used to provide social overhead capital, but sometimes they are used to finance manufacturing activities directly. In closely planned economies, the physical surplus of agricultural output may be taxed away to feed and clothe the industrial labour force and/or to earn foreign exchange on the world market and thereby facilitate the importation of industrial equipment.

Agriculture may contribute to industrial expansion through a fall in the price of agricultural output relative to the prices of manufactured goods. In the course of development the growth of demand for the output of each sector is determined largely by the income elasticities of their respective products. Except at very low levels of *per capita* income, the demand for agricultural products exhibits a relatively low income elasticity, which for many of these products declines as *per capita* income grows. Demand, therefore, should grow less rapidly for agricultural products than for manufactured goods.

The price elasticity of demand is also low for many farm goods. Thus a significant increase in the supply of agricultural products may lead to a decline of prices in this sector relative to prices for manufactures. (This does not necessarily imply an absolute decline in agricultural prices but that usually they are increasing less rapidly than prices for non-agricultural goods and services.) The lower cost for the urban workers of food and clothing, major items in the family budget, in turn permits a relatively lower industrial wage bill and a consequent increase in profits. If it could be assumed that these profits are invested, the shift in relative prices would thus provide an indirect means of diverting resources from the agricultural sector into industrial development.

The above situation exemplifies how a growing agricultural sector may finance industrial growth through a decline in its own domestic terms of trade. A not unusual situation, however, is one in which agricultural stagnation acts as a deterrent to industrial development. Especially where the initial industrialization efforts of the "take-off" stage are financed by an inflow of foreign resources, the juxtaposition of industrial growth and agricultural stagnation may result in an improvement in agriculture's intersectoral terms of trade, and this in turn may serve as an incentive to investment in agriculture.

Although it is generally argued that in the absence of a massive infusion

of foreign resources economic transformation must be financed initially largely by agriculture, not much empirical evidence has been gathered to prove this supposition, and its acceptance rests largely on the logic of the position.

As an illustration of the complex nature of the interaction between the two sectors, data from a study of the economy of China (Taiwan) are presented in table 62. Although the information applies to only one country and to an earlier period, the table is nevertheless instructive and may serve as a frame of reference for discussion. The estimates clearly indicate that a growing net outflow of capital from the agricultural sector occurred during a period of Taiwan's history when the relative importance of industry was growing. Taxes on agriculture were rapidly increasing at the same time that rent and interest payments and voluntary savings were important components of the outflow. The estimates in table 62 also demonstrate that the positive balance of trade enjoyed by agriculture with other sectors was offset by the net outflow of capital. For example, in 1960 the net outflow of goods amounted to $1,931,000 (NT$), and the net outflow of capital was in the same amount. The significant point illustrated by this data is that the capital flow to the non-agricultural sectors finances the net flow of goods from agriculture. Thus the flow of funds from agriculture furnishes the means of purchasing the physical agricultural surplus. This net flow of goods and funds from agriculture to industry should not be regarded as a one-way contribution to growth. The total flow of non-agricultural goods was obviously a key factor in agricultural productivity. These industrial goods, some imported and some produced domestically, were directly responsible for the agricultural sector's ability to produce a surplus.[89] [90] For example, while agricultural output grew by about 300 per cent from 1940–1960 (in real terms)[91] and the outflow of agricultural products to other sectors grew by 240 per cent, that growth was supported by an inflow of intermediate and capital goods that increased by 350 per cent over the period. It is thus evident that the increased agricultural output needed to sustain a growing industrial labour force was made possible by increasing industrial inputs in agriculture, and the manufacture of these inputs was facilitated in turn by the transfer of funds from agriculture to

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[89] On the basis of international comparisons and an analysis of the Japanese experience, Y. Hayami has shown that industrialization promotes agricultural development by improving the conditions of supply through production of modern inputs to agriculture. ("Industrialization and Agricultural Productivity: An International Comparative Study", *The Developing Economies*, No. 1, March 1969).

[90] A number of economists have argued that a pre-existing agricultural surplus is a prerequisite to industrialization. This surplus is defined in physical terms as an excess of agricultural production over the consumption needs of the agricultural sector. See W. Nicholls, "An 'Agricultural Surplus' as a Factor in Economic Development", *Journal of Political Economy*, February 1963, p. 1. In this regard J. Millar has pointed out that "unless the agricultural sector is assumed to be technologically self-sufficient, the surplus of agricultural output over the sector's own consumption cannot be attributed solely to the productive powers of agriculture". Given sector specialization and mutual interpendence, the existence of an agricultural surplus defined in this way is not "a precondition for industrial development, but a mere tautology". ("Soviet Rapid Development and the Agricultural Surplus Hypothesis", *Soviet Studies*, July 1970, p. 81.)

[91] The conversions to real terms were made by using the implicit deflators used to calculate real capital outflow (items 7 and 8 in table 62).

TABLE 62. FLOW OF CAPITAL BETWEEN AGRICULTURAL AND NON-AGRICULTURAL SECTORS, CHINA (TAIWAN)

Millions of current National Taiwan dollars

Item	*1920*	*1940*	*1960*
(1) Total agricultural production	229	599	22,898
(2) Total outflow of agricultural goods	132	416	13,460
Agricultural products	67	215	6,525
Non-farm household	45	105	6,467
Exported directly	20	96	468
(3) Total inflow of non-agricultural goods	77	314	11,529
Intermediate goods	22	99	3,803
Capital goods	2	13	1,057
Consumer goods	53	202	6,669
(4) Net outflow of goods (2 minus 3)	55	102	1,931
(5) Gross outflow of funds	67	164	3,632
Land rent and interest	54	120	1,010
Taxes and fees	12	39	2,102
Private savings in financial institutions	1	5	520
(6) Gross inflow of funds	13	62	1,701
Public investment and subsidy	3	7	187
Investment by non-agricultural producers	1	10	—
Income from non-agricultural production	9	45	1,514
(7) Net outflow of capital (5 minus 6)	54	102	1,931
(8) Net real outflow of capital[a]	64	51	100

Source: T. H. Lee, "Intersectoral Capital Flows In the Economic Development of Taiwan – A Case Study", (unpublished Ph. D. dissertation, Cornell University, 1967), as cited in U. S. Department of Agriculture, Economic Research Service, *Taiwan's Agricultural Development: Its Relevance For Developing Countries Today*, by Raymond P. Christensen, Foreign Agricultural Economic Report No. 39, Government Printing Office, Washington, D.C., 1968, p. 25.

[a] Values in 1936–1937 at constant prices computed by deducting deflated value of total outflow of agricultural products from deflated value of inflow of non-agricultural goods.

industry. From 1940–1960, these capital flows grew by 96 per cent. By comparing the data in item 7 of table 62 with that in item 1, it also emerges that the net outflow of funds from agriculture as a percentage of total agricultural production declined from about 24 per cent in 1920 to approximately 9 per cent in 1960.

It must be pointed out that the net flows of goods and capital could, for some countries, be in the opposite direction, that is the non-agricultural sectors may enjoy a surplus balance of trade with agriculture, in which case a net flow of funds to agriculture would be necessary to finance its trade deficit. This is more likely to occur in countries at intermediate and later stages of development where industry is relatively well developed. Moreover, tax and subsidy policies weigh more heavily on the industrial sector at this later stage, since public revenues are used to raise productivity and income levels among the agricultural population.

In summary, while it has not been proven empirically, the presumption is that net outflows of goods from agriculture sometimes occur in the early phases of industrialization. Since the non-agricultural sectors generally experience higher growth rates, the direction of net flow may be reversed over time, most likely through public policy measures. Finally, as the output of the non-agricultural sectors contributes a growing percentage to total output, the proportional contribution of agriculture to non-agricultural capital formation also declines.

Another link between the sectors evident from table 62 concerns the role of the agricultural labour force as consumers of non-agricultural goods and services. Between 1940 and 1960 the flow of consumer goods into the agricultural sector grew significantly. This growth might continue despite a decline in the size of the agricultural work force, as a result of growing *per capita* incomes in that sector.

The movement of labour from agriculture to industry is also advanced by economists as a necessary factor in the economic transformation. The following statement is extreme but not atypical: "Industrial production can seldom be increased beyond narrow limits except by transferring the necessary manpower from agriculture."[92] The two-sector (industry—agriculture) economic models, often used for planning purposes, incorporate the intersectoral flow of labour as an important variable. In one basic sense it may be argued that the labour flow is more important than the flow of capital. Whereas in an open economy industrial capital may originate abroad, labour is generally less mobile internationally and must be transferred within the country.

Is is not certain, however, that the flows of labour in reality occur as stated in economic development theory. It was noted earlier that the history of the present industrialized countries records a secular flow of labour from agriculture to both industry and the services, so that as agriculture's proportion of total output declined, its share of the labour force also fell. However, the experience of the industrialized countries, from which the essence of economic transformation models was derived, has several features that are not representative of the experience of the currently developing countries. First, the rate of population growth was slow relative to that in most of the developing countries, and the technical processes were much less capital intensive than today. It is often noted that the nature of the capital stock currently utilized in the developing countries reflects the factor endowment of economies now at the apex of industrialization and in which labour is relatively scarce. Given a more rapid rate of population growth and a less rapid rate of labour absorption by industry, it follows that for today's developing countries the transfer of labour from agriculture to industry is less important than it was for countries in the process of industrialization several generations ago.

The empirical evidence supports this thesis. For the period 1960—1968,

[92] Erich Jacoby, "Can Land Reform Help to Establish the Rural Basis for National Development", in R. Robinson and P. Johnston, Eds., *The Rural Base For National Development*, Cambridge, England, 1968.

employment in manufacturing in Latin America grew at an annual rate of 2.8 per cent, while population was also growing at a rate of 2.8 per cent.[93] If the rate of participation in the labour force remained constant over the period, the proportion of the labour force in manufacturing did not change. For Asia (Asian Middle East and South-east Asia) employment in manufacturing grew at an annual rate of 3.4 per cent over the period 1960–1968, while population was growing at a rate of 2.5 per cent annually. In Latin America, the natural rate of increase of the urban population was sufficient to fill industrial labour requirements, and much of the rural-to-urban migration served largely to swell the ranks of the unemployed and marginally employed. In Asia, for example, there was some growth in the proportion of the labour force employed in manufacturing, but the potential growth of this percentage share was cancelled out by the relatively rapid rate of population growth.

Among countries that maintain some balanced growth between agriculture and industry, it is not uncommon to find agriculture divided between a modern and a traditional sector. A basic reason for this dualism is that to obtain sizable and rapid increases in output, agricultural development programmes frequently concentrate resources among relatively few farms, often the larger ones. Consequently, the investment in new farm equipment and techniques becomes narrowly concentrated. The problem is often exacerbated when rapid population growth provides so many new entrants to the labour force that the developing sectors, including the small modern agricultural sector, cannot employ them all. Traditional agriculture, being a residual employment sector, then finds its labour force swollen by additional underemployed. In many countries this is reflected in a substantial growth in the absolute size of the economically active agricultural population at the same time that the share of agriculture in the total labour force has declined. On the other hand, as population presses against relatively fixed land resources, rural-to-urban migration also tends to increase. Because the rate of growth of industrial employment is limited by the rate of industrial investment, such migration has tended to swell the ranks of the urban marginally employed engaged in domestic service, petty trades and the like. In effect, therefore, the urban as well as the rural sector becomes a reservoir of residual employment in many countries. If the sectors exhibiting very low labour productivity are defined as traditional (non-modern), it may be seen that economic dualism is not simply a matter of an urban-rural dichotomy. In many developing countries there are effectively four general sectors: modern urban and modern rural sectors juxtaposed with traditional urban and traditional rural sectors.[94]

Sectoral interrelationships in development strategies

Because of the technical and the macro-economic interrelationships between agriculture and industry, it would be logical for development strategies involving

[93] Employment data are from UNIDO, based on statistics supplied by the United Nations Statistical Office, New York. Population data are from United Nations, *Demographic Yearbook, 1966* (Sales No.: 67.XIII.1).

[94] W. Cole and R. Sanders, "A Modified Dualism Model for Latin America", *Journal of Developing Areas*, January 1972.

the two sectors to be interdependent. Space does not permit an extensive discussion of this complex interrelation. Some examples may serve, however, to illustrate its importance.

First, a strategy designed to promote the growth of agricultural output will, if implemented, make certain general demands and impose some constraints on industry regardless of the nature of that strategy. For example, the growth of agricultural output calls for increased purchases of manufactured inputs such as fertilizers, pesticides, fungicides, tools, implements, water management facilities etc. Some of these items may be produced domestically and some may be imported. To the extent that the demand for these products is met by imports, the availability of foreign exchange to finance the importation of industrial equipment, raw materials and intermediate products is correspondingly reduced.[95] If the programme to promote agricultural development is so ambitious that available foreign-exchange reserves are not sufficient to import the necessary manufactured inputs, its successful implementation would require the establishment of some domestic manufacturing capacity to produce import substitutes, although not necessarily the agricultural inputs themselves. In terms of the allocation of domestic resources for investment, furthermore, the opportunity-cost of increased investment in agriculture may be a reduction in investments in the non-agricultural sectors.

A typical agricultural strategy is selected to illustrate some aspects of its impact on the industrial sector. An agricultural strategy that is often discussed and sometimes implemented involves the promotion of agricultural development on "family farms". If the agricultural sector consists of relatively large farms employing primarily hired labour, the implementation of this strategy first requires either a reform of land ownership and/or the colonization of previously untilled areas.

Some cross-sectoral ramifications of such a strategy might be:

- A shift in the agricultural capital mix. If the average size of the producing unit is significantly reduced, the agriculturists' investments may stress mechanization less and simpler tools and implements more;
- Requirements from the industrial sector would include equipment to clear new land and to build roads, components for new dwellings and farm buildings, and irrigation and drainage facilities;
- A redistribution of income and wealth, creating a broadly based market for low-priced consumer manufactures in contrast to the market for more sophisticated products and luxury goods fostered by the concentration of income among large landowners;
- A reduction of the rate of rural-to-urban migration, with the redistribution of land and concomitantly of income. In countries with rapid population growth and with unemployment and underemployment, this strategy would alleviate some of the pressure on industry to absorb

[95] Of course, if domestic food demand is not met by domestic production, some foreign exchange will be spent on food imports.

labour. On the other hand, if the labour market were tight, such a strategy might be expected to force up industrial wages;

- More public investment in agricultural marketing infrastructure. This would be at the expense of investment in other sectors, although marketing projects would undoubtedly have some linkages with manufacturing. While larger farms may have been able to provide for their own transportation and storage, these would be beyond the means of most small farms created by the land reform;
- A drop in export earnings, if a larger portion of the output of family farms were to be consumed on the premises than was the case with larger producing units. Further, it may be difficult to organize a system among many small farms to promote exports. A decline in export earnings might in turn reduce the amount of foreign exchange available for importation of capital goods for industrial projects.

This listing, which is by no means exhaustive, amply illustrates the cross-sectoral impact of a strategy adopted for the promotion of agricultural growth. Similar influences radiate from strategies to promote industrialization. A common strategy for industrialization is import substitution, which uses the import list as a guide to the selection of new manufacturing projects and is usually implemented by policies designed to protect domestic manufacturers from international competition. Some of the cross-sectoral ramifications of such a strategy (and its attendant policies) are given below:

- Policies to implement a strategy of industrialization through import substitution aim to orient the manufacturing output mix towards those consumer goods currently imported and to direct foreign-exchange expenditures towards the purchase of the capital goods, raw commodities and intermediate products that go into the production of these consumer goods. The investments entailed to promote this strategy may therefore be at the expense of possible manufacturing projects that would produce inputs for agriculture and/or a range of relatively low-priced consumer goods for the rural market;
- Some of the incentives used to promote this strategy may raise unduly the return on manufacturing projects by comparison with agricultural investment opportunities, thereby channelling resources away from investment in agricultural development;
- Protection used to promote industrialization through import substitution often removes the competitive pressure to reduce costs and thus results in inefficiency. This coupled with the fact that domestic production sometimes is promoted when the market is not large enough to permit efficient utilization of equipment means that domestic manufactures are often relatively high priced. In such cases, the costs of agricultural investments may be increased and the cost of living raised, including that in the rural sectors.
- Reliance on imported technology often necessarily results in the utiliza-

tion of capital-intensive techniques and minimizes the necessity of transferring labour from agriculture to industry;

— Effort is diverted from the development of manufacturing sectors that would have substantial export markets and thereby earn foreign exchange, some of which might be used to promote agricultural development.

A comparison of the cross-sectoral implications of the two strategies under discussion reveals that in some aspects they are complementary while in several basic ways they work at cross-purposes. The promotion of small family farms, if successful, should slow the pace of migration from agriculture to urban employment pursuits. This should be efficacious for industrialization via import substitution because of the generally capital-intensive techniques employed in the production of goods formerly imported from the developed countries. In other facets, however, the two strategies are not complementary. Whereas the agricultural strategy would promote a broader distribution of income, the use of import data as a guide to manufacturing investment generally orients the range of manufactured consumer goods towards an upper income bracket. Even more fundamental to agriculture, scarce resources are diverted away from potential projects to support agricultural development, and the allotment of foreign exchange to these consumer-oriented industries severely restricts the agricultural sector's ability to import the necessary capital and other inputs. Further, as noted, there may be a tendency for each of these strategies to discourage exports; they would therefore be noncomplementary in the sense that neither sector would be in a good position to make up losses in foreign-exchange earnings attributable to the other.

The technical interrelationships

If the interrelationship between agriculture and industry is viewed from the standpoint of their respective inputs, the interdependence of the two sectors becomes obvious. Each sector utilizes some type of output of the other in its own production processes. The manufacturing sector uses agricultural output in the milling of grains, the extraction of oil and sugar, and the preservation of food through canning, freezing, drying etc. At another level of food processing, various agricultural products are converted and/or combined into more complicated products such as bakery goods, pasta, beer etc. Several manufacturing branches also process non-food agricultural products such as textile fibres, hides and skins, wood products and tobacco.

In its turn, the agricultural sector utilizes manufactured goods as key inputs in its production process, and the degree of reliance on the products of industry increases as a particular branch of agriculture becomes more modern. The list of manufactured items includes fertilizers, agricultural chemicals, implements, machinery, construction components, and materials for irrigation and drainage facilities, including pumps and the like.

Agricultural dependence on industrial inputs

First, it should be recognized that in a traditional agricultural sector, which is not manifesting significant growth, there is little room for the growth of manufacturing industries based on the production of inputs for agriculture. Sources of traditional inputs already exist and are often an integral part of the agricultural community. For contemporary developing economies there would be no interest in a static traditional agricultural sector; the interest would be rather in a situation in which production must be increased to meet the demands of a growing population. Although it is difficult to document on the basis of broad movements in demand, output, capital and labour, the massive structural transformation that accompanies sustained economic growth evidently requires a growth in productivity in the agricultural sector. Even in the case of a transformation of national output that is not accompanied by a transformation in the labour force, population growth would make it imperative that there be a growth in agricultural output, if not also in agricultural productivity.

By examining the sources of increases in total crop output and productivity, it should be possible to identify those that are afforded by industrial support. The directly identifiable causes of increases in total crop production are increases in cultivated area, changes in crop pattern (from low- to high-value crops), and increases in crop yields.[96] The ultimate purpose of this inquiry is to determine the industrial support necessary to implement these changes.

The data in table 63 indicate that growth in the area devoted to crops has been a very important factor in the growth of agricultural output for most developing countries. It is noteworthy that growth in crop area was more important than growth in yield in 11 of the 16 Latin American countries listed and in 7 of the 14 Asian countries. In contrast, this factor was of no importance in Europe.

Even in some developing countries with ample frontier lands, increases in yield have been the primary factor in the growth of agricultural output. For example, in Mexico from 1940 to 1960 the total area harvested increased by some 70 per cent, but over the same period increased yield was by far the more important contributor to agricultural growth.[97]

In the future the importance of the expansion of the crop area as a basis of increases in crop production will vary widely among countries and regions. It will probably be relatively more important in many of the Latin American and African countries than in many of the Asian countries. If, however, multiple cropping is considered in effect as an increase in the cultivated area, this source may become more important for many countries, particularly India, Pakistan (especially East Pakistan), and the South-east Asian countries. Both the expansion of the absolute area under cultivation and the increased use of multiple cropping depend to a significant extent on non-farm support.

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[96] Inasmuch as measurement is usually in terms of value, the increased output owing to changes in crop patterns may be subsumed under increases in yield.

[97] W. Cole and R. Sanders, *Growth and Change in Mexican Agriculture*, The University of Tennessee, 1970, pp. 72—75.

TABLE 63. AVERAGE ANNUAL GROWTH RATES OF TOTAL CROP OUTPUT, CROP AREA AND OUTPUT PER HECTARE FOR SELECTED COUNTRIES AND PERIODS, 1950—1967

	Period	Total output	Crop area	Output per hectare
		— — Per cent — —		
Africa				
Egypt	1950—1967	2.9	0.6	2.3
Libya	1954—1967	3.7	5.7	—2.0
Morocco	1950—1967	—0.2	—0.2	0.—
Tunisia	1950—1967	—1.9	—1.5	—0.4
Asia				
Burma	1954—1967	1.6	1.9	—0.3
Ceylon	1951—1967	3.2	1.1	2.1
China (Taiwan)	1950—1967	3.8	0.7	3.1
India	1952—1965	2.8	1.3	1.5
Indonesia	1951—1967	1.9	2.2	—0.3
Iraq	1950—1967	2.3	2.1	0.2
Japan	1950—1967	2.4	—0.8	3.2
Khmer Republic	1954—1967	3.9	2.5	1.4
Korea, Republic of	1950—1967	4.3	1.5	2.8
Malaysia	1954—1967	3.7	1.6	2.1
Pakistan	1950—1967	2.7	1.2	1.5
Philippines	1950—1967	4.1	2.7	1.4
Thailand	1950—1967	4.5	2.4	2.1
Turkey	1950—1967	2.2	1.5	0.7
Europe				
Bulgaria	1950—1967	3.0	—1.3	4.3
Greece	1950—1967	4.1	0.3	3.8
Poland	1950—1967	3.1	—0.4	3.5
Romania	1950—1967	3.5	0.—	3.5
Spain	1950—1967	1.6	—0.1	1.7
Yugoslavia	1950—1966	5.4	0.4	5.0
Latin America				
Argentina	1950—1967	2.5	1.1	1.4
Bolivia	1950—1967	3.5	2.3	1.2
Brazil	1950—1967	4.3	4.1	0.2
Chile	1950—1967	2.2	0.7	1.5
Colombia	1950—1967	3.2	1.6	1.6
Costa Rica	1950—1967	3.7	2.3	1.4
Ecuador	1950—1967	4.5	2.8	1.7
El Salvador	1950—1967	5.4	1.4	4.0
Guatemala	1950—1967	6.7	3.4	3.3
Jamaica	1950—1961	3.4	2.8	0.6
Mexico	1950—1965	5.7	3.2	2.5
Nicaragua	1950—1967	7.9	4.4	3.5
Panama	1950—1966	3.1	3.0	0.1
Peru	1950—1967	3.3	2.1	1.2
Uruguay	1950—1967	—0.5	—2.4	1.9
Venezuela	1950—1967	5.4	4.2	1.2

Source: U. S. Department of Agriculture, Economic Research Service, *Economic Progress of Agriculture in Developing Nations, 1950–1968*, Foreign Agricultural Economic Report No. 59, Government Printing Office, Washington, D.C., 1970, p. 16.

Role of industry in the expansion of crop area

Because agriculturists in colonizing new land often utilize traditional, labour-intensive techniques to produce crops, it is sometimes assumed that a minimum of industrial support is required. This is often not the case, however. The absolute area under cultivation is extended by clearing new land, by irrigation projects that open up arid or semi-arid lands, by flood-control projects, and by drainage works that reclaim low-lying and swampy areas. Hence, significant increases in cultivatable areas depend quite heavily on the industrial sector and require long periods of time to realize. Large-scale irrigation projects often do not mature for years. The Chainat Dam in Thailand took 15 years to complete and became fully efficient only after the distances between watercourses were shortened and provision was made for ditch and dike irrigation. Construction on the Nagarjunasagar Dam in India was begun in 1954, and investment in the project amounted to about $156 million by June 1967, with approximately 45 per cent of this sum allocated to canals and distributaries.[98]

Drainage projects may also be quite extensive. The Kambara Plain, now Japan's best rice area with 120,000 hectares and six to eight tons per hectare average yield, was formerly flooded land with perhaps only one undamaged harvest every three years.[99] In parts of South America, flooding prevents some very good alluvial soils from uses other than extensive grazing. Flooding also keeps yields low in the Brahmaputra Basin in Pakistan and in the Chao Pya Valley in Thailand.[100] Although drainage and flood-control projects are costly, the opportunity-cost of not developing such projects is also high.

While land clearance, irrigation and drainage are not characterized as industrial projects, they nevertheless require substantial industrial support in the form of machinery, equipment, cement, pipes etc. The industrial inputs of these projects must be supplied largely from the country's own industrial sector or from a regional producer. The mechanized power necessary to clear large land areas or to prepare and level land adjacent to irrigation projects must be produced industrially, although much of this might be imported. However, if the time needed to bring new areas into production may be prolonged, smaller and cheaper equipment of a less sophisticated type might be used (e.g. saws, shovels), and this would increase the opportunities for domestic production. Even when highly labour-intensive techniques are used, the quantity of simple implements, tools, cement and steel required to clear or level land, to construct a dam and watercourses, or to build new roads or improve old ones must still be sizable. Further, experience has shown that successful and productive use of newly cleared land requires essential support from transportation and com-

[98] Asian Development Bank, *Asian Agricultural Survey*, University of Tokyo Press, Tokyo, 1969, p. 531. This cost is not especially large. The Colorado Basin Development in the United States cost $2 billion; the Indus Basin Project in West Pakistan, $1.2 billion; and the Rajasthan Canal Project in India cost $1 billion. The industrial linkages of such projects are certainly of large magnitude.

[99] *Ibid*, p. 523.

[100] FAO, *Provisional Indicative World Plan for Agricultural Development*, Vol. I, Rome, 1970, p. 47.

munication systems and marketing services. These auxiliary components are also directly linked to industry.

Multiple cropping, which is a technique for expanding effective acreage without putting new land under cultivation, requires extensive support from the non-farm sectors. Besides water-management systems and techniques, successful practice demands fertilizer supplies, some minimum quantity of farm implements and possibly other devices, such as artificial driers. Since it limits the time available for breaking and preparing the soil and for harvesting crops, multiple cropping tends to rely heavily on the mechanization of these phases of agricultural production. Where support systems are available, multiple cropping provides opportunities for increasing output and raising land and labour productivity. In Hong Kong, 80 per cent of the farmers planted over four crops a year and 45 per cent planted seven to nine crops. Studies in Malaysia show that the gross income from a paddy-sweet potato mix or a paddy-mixed vegetable combination was four to seven times greater than that from paddy alone.[101] Expansion of the area subject to multiple cropping is an important aspect of the Indian Fourth Five-Year Plan, and experiments are being undertaken in China (Taiwan), India and the Philippines, where multiple cropping is practiced.

In summary, projects for irrigation, flood control, drainage works and land preparation depend heavily on industrial inputs. The successful completion of such projects over a fairly long period of time and the care, maintenance and improvement of completed works offer considerable stimuli to domestic industry.[102] As further efforts are required to expand agricultural output over the next several decades, projects of this nature will be important in a number of developing countries.

Role of industry in the increase of agricultural yields

For most of the developing countries the most important source of future growth in crop output will be increases in crop yields. As the data in table 64 illustrate, it is possible even from the aggregate figures to discern a decided trend in this direction over the two periods 1948–1952 to 1957–1959 and 1957–1959 to 1966–1968. In the earlier period, from 1948–1952 to 1957–1959, increases in yields accounted for 37 per cent of the change in production of major crops for the developing countries. In the later period, 1957–1959 to 1966–1968, this share had risen to 51 per cent. This basis for expanding crop production should receive more emphasis as unutilized land areas decrease and population pressures grow.

Several factors contribute to sustained and significant increases in crop yields. Irrigation facilities, fertilizer inputs, agricultural chemicals and new seed varieties are generally identified as being primarily responsible for the quite

[101] *Ibid.*, pp. 131–132.

[102] To improve the impact upon domestic industry or regional producers, Governments might resist tied loans and attempt to retain some control over the technology used.

TABLE 64. CHANGES IN YIELD PER HECTARE OF 12 MAJOR CROPS,[a] BY DEVELOPED AND DEVELOPING REGIONS

	Change in yield per hectare (per cent)		*Contribution of change in yield to change in production (per cent of total)*	
	1948–1952 to 1957–1959	*1957–1959 to 1966–1968*	*1948–1952 to 1957–1959*	*1957–1959 to 1966–1968*
Developed regions	26	29	92	102
Western Europe	19	26	84	116
Eastern Europe and the USSR	21	29	64	108
North America	43	35	151	106
Oceania	1	13	51	22
Developing regions	11	13	37	51
Latin America	16	4	43	19
Far East	9	15	36	57
Near East	8	15	24	62
Africa	9	20	35	62
World	19	22	68	80

Source: FAO, *The State of Food and Agriculture, 1970*, Rome, 1970, p. 142.
[a] Wheat, rye, barley, oats, maize, rice, potatoes, ground-nuts, soy-beans, tobacco, cotton and jute.

dramatic growth in crop yields in several areas.[103] If crop yields are initially at relatively low levels, then relatively simple means may be available, rather cheaply, to raise output per unit of land area.[104] Many of these techniques could be classified under improved management practices. They include row planting, crop rotation, better seed selection where improved varieties are not available, better weed, pest and disease control, stricter attention to planting dates and more attention and care to timing and method of harvesting. Although there are regions where innovations of this type alone could increase yields, there is a relatively low ceiling on eventual yields achieved by these means. Once crop yields are raised to a certain level, further increases in output per unit of area are achieved only by improved cash inputs, perhaps in combination with more labour inputs, and an even higher level of management skills. In addition to irrigation works and other water-control projects, these inputs include fertilizers, pesticides, insecticides, herbicides, fungicides, improved seed varieties and mechanization.

[103] The influence on yields of varying amounts of these inputs may be estimated; that of other associated factors is more difficult to assay. Some of the variables that may have important indirect effects are social and cultural in origin. A recent study found the following factors associated with rates of change in crop output: land expansion potential, population growth rate, literacy, health conditions, capital formation, co-operative organizations, extension programmes, tenure features, marketing facilities, and others. Some of these conditions, for example, literacy and extension programmes, require that the country possess agricultural and industrial viability. (U.S. Department of Agriculture, Economic Research Service, *Changes in Agriculture in 26 Developing Nations, 1948—1963*, Foreign Agricultural Economic Report No. 27, Government Printing Office, Washington, D.C., 1965, pp. 13—18.)

[104] Arthur T. Mosher, "Agricultural Economics and Agricultural Development", in Theodore Morgan and George W. Betz, Eds., *Economic Development: Readings in Theory and Practice*, Wadsworth Publishing Co. Inc., Belmont, California, 1970, p. 179.

The improved varieties of rice, wheat, maize, millet or sorghum offer considerable opportunities for increased yields. The semi-dwarf varieties of wheat have yielded up to 120 bushels per acre. The short and stiff-strawed wheat and rice varieties will produce at from double to fourfold the amount of local varieties in a large part of the world's cereal-growing regions. Mexican wheats sown in Turkey on 170,000 hectares in 1968 yielded more than double the production of the same area sown in native varieties.[105] Many of the improved varieties of cereals are not photosensitive and will mature a given number of days after planting. This characteristic permits the planting and harvesting of two or even three crops a year. However, maximum gain using these cereal varieties depends on a package of modern inputs and improved labour practices. The correct and timely application of water, fertilizer and pesticides is extremely important. Further, efficient facilities are necessary to ensure drying, milling, storing and transport.

The application of fertilizers, up to certain amounts and depending on certain crop and physical characteristics, can improve crop yields. Fertilizers are also economically beneficial for crops other than the newer varieties of cereals. The response of many local varieties of cereals and other crops to applications of fertilizer is not significant, however, above a relatively low minimum level of application, which may vary locally. The question of appropriate and adequate use of fertilizers with the improved cereals, on the other hand, is particularly important. A significant advantage of the newer varieties is their strong response to heavy fertilizer inputs. In fact, as more stress is placed upon increasing crop yields, through whatever means, the application of commercial fertilizers to replenish soil fertility becomes an absolute necessity. Further, the interaction effect may be considerable when fertilizers are used in conjunction with other resources. Yield may be increased by fertilizers, by water-management systems or by pesticides, for example. While each of these has a certain effect by itself, a strong interaction effect is evidenced when all of these factors are introduced simultaneously. This interaction causes much higher yields than would be inferred by adding the mean increases from the three sources used singly. Of course, it is often not possible to introduce all three factors simultaneously, in which case the ideal may have to be arrived at in stages.

In spite of the fact that with certain exceptions prices of fertilizer tend to be relatively high in the developing countries, the consumption of this very important manufactured agricultural input in these countries has grown considerably. The data in table 65, which indicate the rapid growth in fertilizer consumption, also show that the developing regions still remain far behind the developed countries in per hectare consumption.

Effective yield increases can also be gained by preventing losses owing to insects, diseases and weeds. Agricultural chemicals such as insecticides, fungicides and herbicides are extremely important in combating these pests. (With regard to weeds, additional labour may be utilized to reduce crop loss.) These agricultural chemicals often give dramatic return. In the high valleys of Mexico,

[105] FAO, *Provisional Indicative World Plan for Agricultural Development*, Vol. I, p. 109.

TABLE 65. CONSUMPTION OF PLANT NUTRIENTS

	Kilograms per hectare of arable land		
	1949–1951	1959–1961	1966–1968
Developing regions	1.4	4.0	10.2
Latin America	3.1	8.2	17.5
Far East	1.6	4.7	12.7
Near East	2.4	4.2	10.7
Africa	0.4	1.0	2.4
Developed countries	22.3	39.5	68.5
World	12.4	21.6	39.7

Source: FAO, *The State of Food and Agriculture, 1970*, p. 141.

protective spraying against blight has helped to increase yields of potatoes by 90 per cent and to expand the area under cultivation by two thirds.[106] Used in conjunction with other inputs, they can be particularly effective and may come to be even more important as other barriers to achieving higher yields are removed.

The storage of durable commodities and perishable products is an important complement to production. By decreasing the quantities lost by the producer after harvest, and by the middlemen between producer and consumer, a more efficient storage system results in a net increase in food supplies. (Whether the output increase is owing to expansion of area or to an increase in yields, additional storage facilities will be required.) For most of the less developed countries, the storage of durable foods has a higher priority than does the provision of refrigerated storage for perishables. However, refrigerated storage facilities for the preservation of fruit, vegetables, fish and meat may be quite important for the exports of some countries. With increasing urbanization, higher incomes and the development of meat and dairying industries, refrigerated storage facilities will become more important. In all cases, however, the provision of storage facilities requires manufactures, whether imported or locally produced, such as corrugated metals, cement, lumber etc.

Mechanical improvements may also raise productivity per worker and crop output. Various means of mechanization may be applied in clearing, levelling and preparing land for planting. Mechanized power may be necessary for performing deep cultivation or working dry soils or heavy soils prior to rainfall, and it may also be used in threshing, transport, pumping water and the drying of crops. An increase in output owing to mechanical improvements is most noticeable in the preparation of land and in planting and harvesting. The necessity for early plowing and seed-bed preparation and timely planting may prove bottle-necks to higher yields, and various forms of mechanization may be required. If harvesting is not promptly started and finished, increased yields may not be realized. Mechanization reduces the time required.

[106] U.S. Department of Agriculture, *Potato Blight Epidemics Throughout the World*, by A. E. Cox and E. C. Large, USDA Agricultural Handbook No. 174, Government Printing Office, Washington, D.C., 1960.

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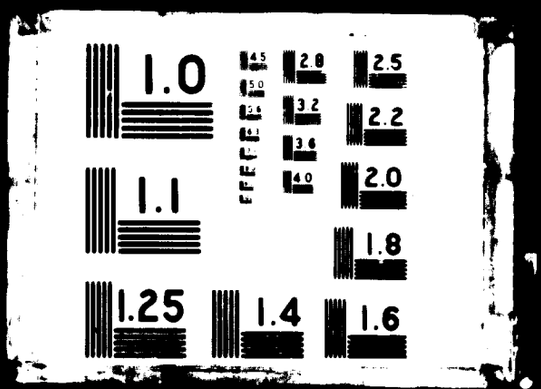

Timeliness is highly important where multiple cropping or other innovations are depended on to make still other improvements economically feasible. Increased mechanization may therefore be a necessity for the success of multiple cropping.

Mechanization does not refer only to power machinery. Improved animal draft equipment, the shift from wooden to steel-pointed plows and from wooden wheels to rubber-tired wheels are important. The use of animal-draft seed drills and planters can reduce planting time.

The degree of mechanization in the developing countries is difficult to determine. Table 66 indicates increases in the use of tractors; however, it would also be relevant to know such things as the number of steel ploughs that have replaced "desi" ploughs in India. The question of degree and kind of mechanization is difficult to consider on an over-all basis. In parts of Asia it may be that draft animals can be used economically only in association with other farmers. The minimum size farm for the economic use of animal-draft mechanization is considered to be two hectares for an intensively worked, irrigated farm and from four to six hectares for dryland farms. A 40 horsepower tractor can be economically used on 15 to 25 hectares of irrigated land or on 40 to 100 hectares of dryland. A tractor of this size must be used a minimum of 600 to 800 hours for an economic return.[107] Efficient mechanization usually requires an even greater effort to intensify production, an effort that in turn depends on increasing the use of fertilizers and other innovations and, perhaps, irrigation, all of which are closely linked to the manufacturing sector.

In summary, growth in crop output is propelled by an expansion in cultivated area, an increase in yields per unit of soil cultivated, or by some combination of the two. As a country approaches maximum utilization of soil resources, the conversion from the expansion of crop area as a method of increasing output to a technology of increasing crop yield becomes a crucial factor in further development. It may be that the length of time required to make the change-over,

TABLE 66. GROWTH IN NUMBER OF TRACTORS USED IN AGRICULTURE IN DEVELOPING AND DEVELOPED COUNTRIES

	Annual averages of total numbers (thousands)			*Average annual increase (per cent)*		
	1949–1951	*1959–1961*	*1966–1968*	*1949–1951 to 1959–1961*	*1959–1961 to 1966–1968*	*1949–1951 to 1966–1968*
Developing countries .	197	554	906	11	7	9
Latin America.....	121	335	525	11	7	9
Far East	12	60	126	17	11	15
Near East.....	26	77	141	11	9	11
Africa	38	82	114	8	5	7
Developed countries ..	5,816	10,302	13,348	6	4	5
Total.....	6,013	10,856	14,254	6	4	5

Source: Based on FAO, *The State of Food and Agriculture, 1970*, p. 142.

[107] FAO, *The State of Food and Agriculture*, 1968, p. 95.

and the ability to do so, depends quite heavily on the non-farm sector. A sustained increase in yields, more so than expansion of cultivated area, appears to be sustained by and dependent on the widespread adoption of new and improved techniques and inputs, which are largely manufactures. In cases where new land accounts for the growth of agricultural output, the importance of additional manufactured inputs is concentrated on the frontier, which is always only a small portion of the farm sector. On the other hand, when reliance is on increased yields, the additional manufactured inputs are more widely distributed. It is rarely possible for fixed-area agriculture, with increases in output dependent for the most part on increases in yields, to exist separately from a country's industrial sector and still make a positive contribution to economic progress.[108] Gains in yields depend heavily on the non-farm sector and where this sector is relatively large, more rapid gains are possible.

Key industries supporting agriculture

From the preceding discussion it is obvious that the possibility of achieving greater agricultural output depends to a considerable degree on the possibility of achieving greater industrial output. It is highly significant that, apart from seed production, none of the new, improved inputs required by a progressive agriculture are produced in that sector.[109] The construction materials for roads, irrigation and other water-control projects, and for storage and processing plants and power systems are industrial output. The electric or gas-powered pumps for water transfer, simple or more complex farm machinery or implements, and agricultural chemicals are products of an industrial matrix. Although figures cannot be given, it is evident that for many countries much of this output must be produced by domestic industry if it is to be available, since the requirements in foreign exchange would exceed their capabilities to import it.

At this point it should be appropriate to examine those major branches of industry that provide the agricultural sector with inputs.

Fertilizers. The potential contribution of fertilizers to raising crop output has been widely studied and it is now realized that reliance on them will eventually be almost total. In the developing countries the rate of increase in food production for domestic consumption for the period 1955–1958 to 1965–1967 was approximately 2.6 per cent, falling slightly in the later part of this period to 2.4 per cent. Based on forecasts of population growth and changes in income, it has been estimated that the developing countries need to accelerate their rate of increase in food production to 4.3 per cent annually to avoid dependence on imports that would be impossible to support. At continued rates of growth in population, income and food output, imports would amount to more than

[108] Of course, primitive or traditional agricultural sectors, which presently employ no significant plant nutrients, may by the application of manure, for example, obtain increases in yield without industrial support.

[109] Historically, production of traditional farm implements began at the village level. This has also been the case in the presently developing countries.

TABLE 67. WORLD PLANT NUTRIENT CONSUMPTION BY DEVELOPED AND DEVELOPING REGIONS
(Thousand tons)

Fiscal year	Developed regions					Developing regions				Total World
	North America	Western Europe	Eastern Europe	Oceania and Japan	Total	Asia	Africa[a]	Latin America	Total	
1955	5,887	7,426	1,640	1,877	16,830	907	459	481	1,847	18,677
1956	5,846	7,846	3,704	2,043	19,439	1,045	481	570	2,096	21,535
1957	6,101	8,322	4,067	2,086	20,576	1,311	489	682	2,482	23,058
1958	6,250	8,840	4,423	2,030	21,543	1,589	591	691	2,871	24,414
1959	7,100	9,233	4,800	2,268	23,401	1,541	627	720	2,888	26,289
1960	7,146	9,785	5,066	2,385	24,382	1,819	568	739	3,126	27,508
1961	7,564	10,004	5,264	2,768	25,600	1,922	712	959	3,593	29,193
1962	8,158	10,542	5,514	2,607	26,821	2,322	727	976	4,025	30,846
1963	9,174	11,340	6,117	2,620	29,251	2,542	785	1,061	4,388	33,639
1964	10,092	11,965	7,156	2,933	32,146	2,975	837	1,368	5,180	37,326
1965	10,514	12,513	8,957	3,242	35,226	3,343	923	1,482	5,748	40,974
1966	11,996	12,977	10,631	3,481	39,085	3,809	1,095	1,557	6,461	45,546
1967	13,489	13,353	11,700	3,682	42,224	5,394	1,172	1,795	8,361	50,585
1968[b]	14,775	14,081	13,228	3,576	45,660	6,139	1,330	2,225	9,694	55,354

Source: Tennessee Valley Authority, National Fertilizer Development Center, *Fertilizer Trends, 1969*, by Edwin Harre, Muscle Shoals, Alabama, 1969, p. 95.
[a] Includes Egypt and South Africa, which together account for more than 50 per cent of African consumption.
[b] Preliminary.

one fourth of domestic consumption by 1985.[110] It should be noted that the required rate of acceleration in production is beyond the experience of any of the currently developed countries. While a part of this increase may be achieved by expanding the area under cultivation, a larger share, over time, will have to come from growth in yields, as previously discussed. Evidently, when grain requirements exceed a level of production of 800 to 1,200 kilograms per hectare and under conditions of insufficient soil fertility and insufficient quantities of manure, the use of fertilizer becomes essential.[111]

Accordingly, fertilizer consumption in the developing countries has advanced rapidly. However, although the growth in the rate of consumption has been greater than that for the developed countries, the developing countries still consume less than 20 per cent of the world's commercially produced soil nutrients. Consumption figures by region are shown in table 67. In Europe in 1967/1968, the average consumption was 139 kilograms per hectare, ranging from 29 kilograms in Albania to 626 kilograms in the Netherlands. Average consumption in Asia was about 19 kilograms per hectare of arable land; in South America 11 kilograms; and in Africa approximately 6 kilograms.[112] As shown in table 68, production in the developing regions has not been capable of meeting the expanding demand for fertilizers.[113] On an over-all basis, the production of these countries accounts for about one half of their consumption.

A forecast of fertilizer consumption in 64 developing countries is given in table 69. The forecast assumes an annual rate of increase in crop output of

TABLE 68. DOMESTIC PRODUCTION AS PER CENT OF TOTAL CONSUMPTION OF NITROGEN, PHOSPHATE AND POTASSIUM FERTILIZERS IN SELECTED DEVELOPING COUNTRIES, 1965—1966[a]

	Nitrogen	*Phosphorus*	*Potash*
Latin America	77	50	12
Africa south of the Sahara	—	54	—
Near East and North-west Africa	42	190	—
Asia and the Far East	47	51	1
Total	53	71	4

Source: FAO, *Provisional Indicative World Plan for Agricultural Development*, Vol. I, p. 196.
[a] The 64 countries included in the data accounted for 84 per cent of the population of the developing world.

[110] FAO, *Provisional Indicative World Plan for Agricultural Development*, Vol. I, pp. 13—16. If present trends continue, domestic food production in the developing countries would be approximately $66 billion in 1985, total demand $92 billion, leaving $26 billion in imports. The current dollar figure at that time would be higher because the forecast used 1962 prices and took only 60 per cent of c.i.f. value of imports to make them comparable with production at producer prices.

[111] Frank W. Parker, "Fertilizer and Economic Development", in M. H. McVickar, G. L. Bridger, and L. B. Nelson, Eds., *Fertilizer Technology and Usage*, Soil Science Society of America, Madison, Wisconsin, 1963, p. 9.

[112] FAO, *Fertilizers, 1969*, Rome, 1970, p. 16.

[113] The increasing use of fertilizers, in combination with improved cereal varieties and other improved inputs, is the basis of the current optimism regarding food production. It is also the reason for revised world forecasts, which anticipate difficulties for countries relying on cereal exports. (U.S. Department of Agriculture, Economic Research Service, *World Demand Prospects for Agricultural Exports of Less Developed Countries in 1980*, by Anthony S. Rojko and Arthur B. Mackie, Foreign Agricultural Economic Report No. 60, Government Printing Office, Washington, D.C., 1970.)

approximately 4 per cent and a rise in the rate of expansion of demand for fertilizers from 10.8 per cent a year (realized in the period 1954–1962) to 11.4 per cent a year. Although it will vary from country to country, a steadily widening gap between domestic demand and domestic production will create additional foreign exchange problems for most. Turkey, for example, expanded nutrient production from 8,142 tons in the middle 1950s to 81,015 tons in 1968/1969, but consumption rose over this period from 21,753 tons to 380,049 tons. In the middle 1950s, India produced an average of 89,883 tons of nitrogen, phosphate and potash fertilizers a year. Domestic production expanded to 776,000 tons in 1968/1969, but consumption over the same time span rose from 147,547 to 1,682,000 tons. For the same period, Pakistani production went from 108 tons to 137,800 tons, while consumption increased from 16,230 to 391,800 tons. Production in Egypt rose from 39,509 to 172,000 tons, while consumption expanded from 130,742 to more than 300,000 tons.[114] The magnitude of these differences between production and consumption and the varied and cumulative demands made upon available foreign exchange have tended to encourage the establishment of domestic fertilizer industries, even where raw materials, manufacturing equipment and skills must be imported.

For developing countries in the early stages of agricultural modernization, fertilizers will surely have to be imported, even possibly when the country possesses one or two of the required raw materials. As domestic consumption rises, the possibility of national production improves. The question then often hinges on the cost and feasibility of using imported raw materials or intermediate products and the cost of local production versus continued importation of the final product. The decision entails an evaluation of alternate uses of foreign exchange. For countries possessing the requisite raw materials, the feasibility of domestic production is naturally greater.

Developments over the past decade have enabled several of the less developed countries to establish fertilizer production capacity and other countries to consider seriously domestic production. First, the expanding consumption of fertilizers has made them an increasingly important item on the import list and has centered attention on the possibility of an import-substitute fertilizer industry. Second, fertilizers have assumed increased strategic importance in raising agricultural output, and this has caused Governments to encourage their use. Target goals have been established of roughly 10 kilograms of nitrogen, 5 kilograms of phosphorus, and 2.5 kilograms of potassium on a *per capita* basis by 1975, subject to modification on a country basis.[115] Third, a series of technical developments relating to major fertilizer inputs have opened up new alternatives.[116] Technical advances in ammonia production and capacity increases have caused a drop in the price of ammonia. Ammonia may now be transported by the shipload and liquified

[114] FAO, *Fertilizers, 1969*, pp. 133–137.

[115] UNIDO, *Fertilizer Industry*, Monographs on Industrial Development No. 6 (Sales No.: 69.II.B.39, Vol. 6), p. 9.

[116] Raymond Ewell, "Fertilizer Outlook in the Developing Countries", in UNIDO, *Factors Inhibiting the Indigenous Growth of the Fertilizer Industry in Developing Countries*, Report of Ad Hoc Group of Experts from Fertilizer Deficit Countries, Vienna, 1968 (Sales No.: 69.II.B.21), p. 80.

TABLE 69. ESTIMATED FERTILIZER REQUIREMENTS[a] FOR CROPS IN 1975 AND 1985 AND ESTIMATED ANNUAL COST OF FERTILIZER REQUIREMENTS, 1962, 1975 AND 1985, FOR SELECTED DEVELOPING COUNTRIES

	1975		1985		Estimated annual cost (million dollars)		
	Thousand tons	Index 1962 = 100	Thousand tons	Index 1962 = 100	1962	1975	1985
Latin America	3,174	385	6,527	792	218	883	1,861
Africa south of the Sahara	277	531	662	1,268	14	76	180
Near East and North-west Africa	1,387	323	2,575	598	97	329	616
Asia and Far East	9,819	773	21,411	1,686	335	2,392	5,181

Source: FAO, *Provisional Indicative World Plan for Agricultural Development*, Vol. I, pp. 198–199.
[a] Nitrogen, phosphorus and potassium.

natural gas may be moved by ocean transport. Production techniques now allow the commercial manufacture of nitrophosphate fertilizers, which removes the need for sulphur. It should be noted, however, that the desulphurization of fuels has created a sulphur surplus in the world, and in some areas sulphur is an important plant nutrient. Phosphoric acid can now be shipped by sea and superphosphoric acid will be available for transport by the shipload in the near future. Also, the economic transport of elemental phosphorus should soon be feasible. The major advantage in utilizing the foregoing items as production inputs is the high concentration of the intermediate product.[117]

This series of developments has made it possible for more countries to consider domestic fertilizer production even when a country possesses none of the necessary raw materials. The ideal approach is to consider integrated facilities. Farmers can use straight fertilizers, but this requires several applications of varying amounts of nutrients. In addition, if nitrogen fertilizers are made available without phosphorus, the soil will become depleted in a few years of heavy yields. Mixed fertilizers, compounded on a regional basis in consideration of crop and soil characteristics, assure a proper input. In those developing countries where agricultural extension services are scarce, and experience with fertilizers is limited, it is usually recommended that mixed fertilizers be applied.

The construction costs of fertilizer plants in a developing country are quite likely to be 25 to 50 per cent higher than in a currently developed country.[118] Such factors as an extended construction period, owing to lower on-site labour efficiency, higher engineering costs, the cost and transport of imported construction materials and equipment, and perhaps the need for stand-by generating equipment, tend to raise total construction costs. Operating costs are affected by the need for rather large inventories of raw materials and by significant labour-training costs. The seasonal use of a product manufactured on an annual basis may also present storage problems which may be especially severe in developing countries. If adequate facilities are not available for movement of commodities in bulk, an additional construction cost must be incurred.

Questions of plant size and operating efficiency are particularly important. Economies of scale weigh heavily in the production of fertilizers and the average percentage utilization of capacity is fairly critical. Where national demand is not sufficient to support a plant of minimum size, the cost of fertilizer increases quickly. If a large plant is constructed and then not used to capacity, however, the country has high-cost fertilizers and investment tied up in unutilized hardware. Where a plant of adequate size is built and must be operated at much less than 70 per cent of capacity, product costs per unit of output mount quickly. While there may be considerable variation from plant to plant, production at 70 per cent of capacity may be taken as a typical break-even point, below which the operation is uneconomic.[119] Fertilizer plants in many developing countries

[117] One ton of elemental phosphorus used in the "thermal" production process would supply as much P_2O_5 as 7.5 tons of phosphate rock and 2.2 tons of sulphur used in the "wet" process.

[118] Asian Development Bank, *op. cit.*, p. 560.

[119] UNIDO, *Fertilizer Industry*, Monographs on Industrial Development No. 6, p. 47.

operate at 50 to 60 per cent of capacity even with continuing imports of fertilizers. The reason often lies in bottle-necks in the supply of raw materials, especially when the fertilizer industry must compete for scarce foreign-exchange reserves in order to import a key primary input, bottle-necks in transport and storage or inadequate labour skills.

Once fertilizer plants are in production, the actual process of manufacturing requires relatively little labour. However, planning officials may want to consider more than the direct employment effect of the fertilizer industry alone. Additional employment will also result from planting, harvesting and processing the larger output. The import content of capital equipment and parts must also be considered in choosing between expenditures on a fertilizer industry and on other heavy industrial projects. Where raw materials or intermediate products must be imported, foreign-exchange savings will of course be less than the previous import bill for fertilizers. When there is a significant foreign-exchange savings, it may be that more fertilizer can be made available to the country's farmers from a domestic industry, even when some materials must be imported, than could be afforded by foreign-exchange expenditures for the final product.

The backward linkages of the fertilizer industry may serve to promote development of a more sophisticated industrial structure. Sulphuric, nitric and phosphoric acids are basic inputs to the fertilizer industry and can be linked to a broadly based chemical industry. Synthetic ammonia is the prime ingredient in a variety of chemical products. Other ammonia products, such as urea, ammonium sulphate, ammonium nitrate and ammonium phosphate are used in the production of plastics and explosives as well as in the food industries and in the production of some pesticides. The fertilizer industry also has important linkages to steel, heavy chemicals and petrochemical industries.[120]

Pesticides. The demand for agricultural chemicals, which protect crops against pests, weeds, rodents and disease, will increase as agricultural development proceeds. Some of the new cereal varieties are particularly susceptible to disease and planting in contiguous cultivated areas raises the likelihood of widespread damage. From 1959–1964, the average rate of growth in the consumption of pesticides was 9.5 per cent.[121] In some countries, however, there were quite large increases. The annual rate of increase in imports of pesticides, by value, for the period 1961–1965 for China (Taiwan) was 44 per cent; imports grew at an annual rate of 37 per cent in India, 30 per cent in Pakistan and 26 per cent in Thailand. In 1965–1967, imports increased by 175 per cent in Ceylon.[122] Nevertheless, consumption in the developing countries is quite low. These countries consume approximately 20 per cent of all pesticides on 70 per cent of the world's arable land.[123] More than three quarters of this consumption is imported, with the United States currently supplying more than one half of the world production.

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120 *Ibid.*, p. 50.
121 FAO, *Provisional Indicative World Plan for Agricultural Development*, Vol. I, p. 212.
122 Asian Development Bank, *op. cit.*, p. 515.
123 FAO, *Provisional Indicative World Plan for Agricultural Development*, Vol. I, p. 209.

Owing to the rapid growth in demand, there is opportunity for domestic manufacture of pesticides or at least the establishment of formulation plants in a number of countries. The content of active ingredients in pesticides is quite low, and the importation of the final product means paying transportation costs on the inert ingredients. The establishment of formulation plants, obtaining inert materials locally or from nearby sources, is a distinct possibility and may be the first step towards eventual domestic production of the active ingredients. While local manufacture may be feasible in certain countries, heavy research support is a necessity, because many insects gain immunity to a given kind of insecticide after a time, and adjustments must then be made. The extensive use of these chemicals also presents other difficulties to a developing country where extension service is limited. Collective protection is advantageous because control measures are more efficient when spread over a wide area. The benefits of isolated usage may not be great.

Machinery and implements. The production of agricultural machinery is in many aspects related to the ability to support industrial expansion in general. For most of the developing countries, the demand for tractors and replacement parts is still too limited to support domestic production facilities. Data on relevant questions concerning the production of farm machinery and power equipment are difficult to locate; therefore, answers to inquiries about minimum scale of production, investment needs and similar questions are necessarily general. However, certain requirements for some products may be stated. For example, domestic production of tractors would probably require a minimum industrial capacity in an iron and steel industry capable of producing castings, forgings and malleables. Specialized manufacturing is also necessary for the production of components such as ball bearings, radiators, clutches, linings, electrical equipment, tires, fuel-injection equipment and diesel engines.[124] For the most part the industries producing agricultural machinery are still located primarily in the industrialized countries. Various machinery products, however, are produced in several of the developing countries. Tractors are assembled in India, where a high proportion of the components are domestically produced, and in the Philippines, where parts are imported. Argentina and Mexico also assemble tractors with more than half of the parts furnished by domestic production, and Brazil produced tractors, largely from domestically produced components. China (Taiwan) produces and exports small powered tillers.

The domestic production of agricultural implements or tools need not initially be oriented towards the manufacture of sophisticated, automatic machinery. In a number of countries implements such as plows and harrows are needed for use with animal power. India manufactures most of her own farm machinery, except tractors, and exports some of these products, as does China (Taiwan). In Latin America, Mexico and Argentina manufacture, and export to some extent, disk plows, harvesters, tillers and other plows.

Water pumps are manufactured in several Asian countries. The local manufacture and maintenance of equipment to apply agricultural chemicals such as

[124] FAO, *Provisional Indicative World Plan for Agricultural Development*, Vol. I, p. 234.

portable hand sprayers and dusters are also a practical proposition.[125] Other equipment, such as pedal threshers, handcarts, bullock equipment and rice-milling machinery, may also be considered. The steady and rather predictable growth in demand for these goods makes them likely candidates for domestic industrial production.[126] The production of this variety of goods does not require vast industrial complexes and can often take place in relatively small shops which can be easily expanded as demand increases.

In summary, local production of these items may offer significant foreign-exchange savings and also offer a satisfactory training ground for both entrepreneurs and labour force for subsequent industrial progress. Small-scale plants can draw on local capital sources not available to larger enterprises, and thus foster further industrial involvement.[127] These plants may also be widely dispersed so as to distribute employment opportunities.

Industrial processing of agricultural products

The particular segments of industry that utilize the output of farms, forests, fisheries and grasslands perform a valuable function for the agricultural sector and they are relatively strategic for economic development. These industries promote the utilization of raw materials by making them available to the non-farm sector in a more convenient form for consumption. By taking up, improving and adding to many of the functions previously performed by members of a rural society, these industries open up new investment and job possibilities for an urbanizing society. By co-ordinating purchases, offering storage and preserving functions, and stressing uniformity and quality of output, they stimulate agricultural output and productivity and have a beneficial effect on incomes in the agricultural sector. Many of the industries using agricultural products as inputs are traditionally pioneer industries in a developing economy. Historically, these products were among the first to undergo transformation in the present industrialized countries.

The processing of agricultural commodities covers a broad range of activities which may be grouped under food processing and non-food industries. The milling of staple food grains is generally the largest food industry in developing countries. In a number of countries the wheat-milling industry has grown rapidly and has become widespread in the past two decades. Modern wheat mills are highly capital intensive with relatively small employment requirements. Original investment costs run into several millions of dollars with a noticeable decline in operating and capital cost per unit of output the larger the mill. However, in many countries with poor transportation systems and inadequate or insufficient storage for large quantities of grain and output, smaller-size mills are practical. Although direct employment benefits may be small, the indirect effects may be substantial, particularly where there are small baking shops.

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[125] Asian Development Bank, *op. cit.*, pp. 567—573.

[126] FAO, *The State of Food and Agriculture*, 1966, p. 126.

[127] Eugene Staley and Richard Morse, *Modern Small Industry for Developing Countries*, McGraw-Hill, New York, 1965, p. 236.

Rice-milling is an important activity in many of the less developed countries and for much of the world's population. Large modern mills, which require high capital costs, are advantageous in that paddy drying and storage facilities are available and a higher percentage of the input may be recovered. Furthermore, only large-scale modern mills could ensure the recovery of the most valuable by-products, such as high-grade edible oil and protein-rich bran, which could contribute largely to the economy of the rice-producing countries as well as to the competitiveness of the rice processors and exporters. Such mills are not always feasible, however. The larger mills require concentrated paddy production in order that they might be operated throughout the year. Transportation facilities in many of the Asian countries hinder the development of such mills. Under the circumstances, smaller mills may be considered feasible. These smaller mills may be located close to the sources of supply and they are not so dependent upon a source of continuous supply. The smaller mills vary in degree of efficiency and in the range of services offered. The recovery rate from paddy may vary between 57 to 65 per cent and the milled rice may contain a substantial proportion of broken rice. In many of the Asian countries, such as Ceylon, Indonesia, Pakistan and the Philippines, milling machines and hulling machines are locally manufactured.[128] Although quality milling and hulling machines may be imported, it appears that strong support from local manufacturers in efforts to improve the performance of their product would be beneficial. An increase in the recovery rate from rough paddy of two or three percentage points may effectively increase rice production.

A prerequisite for the efficient functioning of large-scale mills is the adequate procurement of paddy. This involves a restructuring of the traditional in-between paddy trade and revised organizational and legislative measures. Attempts have been made in this direction by the establishment of official grading systems and central paddy purchasing boards; these efforts are noticeable and deserve every support.

In a number of developing countries maize and sorghum are the more important cereal crops and they may serve as the basis for food processing, feed production and other industrial uses.

Sugar manufacturing also promotes the development of other industries. The manufacture of alcohol from molasses and pulp and paper from bagasse are prime examples of by-product industries. Sugar is a requisite commodity for the expansion or development of several other food-processing industries, such as fruit canning, confectionary, fruit juices and various beverages. The demand for processed fruits and vegetables is not likely to be initially high in the developing countries, although demand expands as income rises. In many cases, of course, export markets may be utilized. Aside from considerations of demand, other factors inhibit the faster growth of this industry. The quality of raw material may be low and may vary considerably. These plants also require a continuous supply of raw materials and this problem may prove a serious obstacle.[129]

[128] Asian Development Bank, *op. cit.*, p. 574.

[129] FAO, *The State of Food and Agriculture, 1966*, pp. 100—101.

The processing of meat and dairy products also expands as urbanization continues, incomes rise and the production of feed grains increase. But these industries may encounter problems when initial operations are based on large-scale facilities and Western-type markets, but rely on traditional sources for the supply of raw materials. Ghana, for example, has two large, modern slaughter-houses and refrigeration plants, but one is operating at 10 per cent of capacity and the other at 2 per cent.[130]

The establishment of food-processing industries offers several possibilities to induce growth. Their development should stimulate demand for transportation, packing materials, tin-plate and glass containers.[131] Where these industries induce expansion in agricultural output there will be allied effects upon demand for fertilizers, agricultural equipment, pesticides and animal feeds.[132] In certain cases, food-processing industries may provide important export opportunities. China (Taiwan), for example, has co-ordinated its sugar and pineapple industries to establish a rapidly growing canning industry based on exports. Originally relying on canned pineapple, the industry has expanded to encompass a wide variety of products. From 1960–1966, exports of canned mushrooms increased in value from $150,000 to $25 million. Exports of canned asparagus have also grown rapidly, increasing from $411,000 in 1964 to $14 million in 1966. These industries have been developed largely along integrated lines and the Government, private industry and growers' associations have co-ordinated their efforts to increase the quantities of raw materials available in improved and standard qualities. Aspects of this co-ordination are evident from field to factory to market.[133]

Among the more important non-food industries processing agricultural output are those based on the natural fibres, cotton being the most important, followed by jute, kenaf and allied fibres. Although these fibres have suffered from the competition from man-made fibres, they are still extremely important in the industrial structure of the developing countries. By 1966, the developing countries accounted for 42.6 per cent of the world production of cotton cloth—up from 30.6 per cent in 1954—and produced 83.3 per cent of jute and allied fibres. They consumed about 43.7 per cent of the world output of cotton apparel cloth, up from 35.1 per cent in 1954.[134]

The textile industry has significant backward and forward linkages. The demand for fibre can stimulate domestic cotton production, and the production of textile cloth provides an input to the clothing industry. Although they accounted for only 5 per cent of value added in manufacturing in 1967 in the developing countries, the clothing, footwear and made-up textile industries grew at a higher rate from 1960–1966, at 6.5 per cent, than did the textile sector,

[130] FAO, *The State of Food and Agriculture, 1970*, p. 119.

[131] It must be recognized that in the absence of domestic production capabilities such a stimulation of demand may constitute a drain on foreign-exchange reserves.

[132] UNIDO, *Food-Processing Industry*, Monographs on Industrial Development No. 9 (Sales No.: 69.II.B.39, Vol. 9), p. 54.

[133] Asian Development Bank, *op. cit.*, p. 576.

[134] UNIDO, *Textile Industry*, Monographs on Industrial Development No. 7, pp. 12, 18.

thus supplying new jobs in these countries.[135] While in some of the developing countries rates of increase in textile production have been quite high, there is apparently opportunity for much greater production and consumption in these countries. In 1964—1965, in the United States, *per capita* consumption of all textile fibres was 17.4 kilograms, but cotton supplied 9.8 kilograms. *Per capita* consumption of cotton textile fibres in the developing countries in the same period was only 1.9 kilograms. Although demand for cotton textiles tends to decline at higher income levels, a stimulus for this industry exists in the developing countries where incomes are increasing from low to moderate levels.[136] Some observers question whether the proposition that the demand for cotton textiles declines at higher income levels would apply to tropical countries.

Textile production offers several advantages to developing countries. From the viewpoint of production there is some opportunity to mix capital and labour in combinations more suitable to the employment needs of the less developed countries. Capital costs vary considerably even among the developed countries. Cotton mills generally tend to be less capital intensive and to require less fuel and power per worker than the average manufacturing plant in the developing countries.[137] Jute bag manufacture can be undertaken with modest capital outlays, and the production of cordage and other products from hard fibres need not employ capital-intensive processes.[138]

Wood-products industries are also a vital link between agriculture and industry. There has been an increase in the use of tropical hardwoods for construction in Europe, and the United States imports large quantities of plywood, mainly from Asia and the Far East. The Philippines export hardwood logs to Japan for further processing and Indonesia exports significant quantities to the Republic of Korea. Malaysia and Singapore export plywood and veneer to the United States.[139] These and other countries are making an attempt to further process forest products before they enter the international markets. Cameroon, the Ivory Coast and Zaire, for example, have raised, or intend to raise, export taxes on unprocessed logs. The development of particle board has allowed the use of formerly waste wood and smaller-size timber. The progress in the technology of semi-chemical pulping methods further encourages the development of the pulp and paper industry, which is of course linked to timber production.

Leather and leather-products industries utilize agricultural by-products as their basic input. A large proportion of the world supply of hides and skins comes from small producers in the developing countries. From the point of view of supply, many developing countries appear to have great potential for sustaining investments in the tanning industry, based on large cattle populations.

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[135] UNIDO, *Industrial Development Survey*, Vol. II (1970), pp. 22, 31, 35.

[136] John L. Sinclair, *The Production, Marketing, and Consumption of Cotton*, Praeger, New York, 1968, pp. 46—47.

[137] FAO, *The State of Food and Agriculture, 1966*, p. 110.

[138] UNIDO, *Textile Industry*, p. 46.

[139] FAO, *The State of Food and Agriculture, 1970*, p. 87.

However, it must be cautioned that there is considerable competition in the world market for tanned hides and problems often arise regarding the quality of hides of livestock from many developing countries. When it comes to finished leather products, the developed market and centrally planned economies dominate the industry, as is demonstrated by the data on value added in table 70.

In summary, agro-related industries are of considerable importance in the developing countries as indicated by their relative contribution to total manufacturing output (see table 70).[140] As the developing countries begin industrialization, possibly by exploiting import-substitution opportunities, high growth rates may be achieved in these industrial categories. Table 71 gives the growth rates for various agro-related industries. It is of interest to note that with the exception of textiles, the rate of growth of these industries is consistently greater for the developing countries than for the developed market economies. In the early stages of industrialization, agro-related industries may tend to lead the drive to industrialize, but as the economy grows, diversifies and becomes more sophisticated, the relative importance of these primary industries declines. The reasons for the decline correspond to those discussed earlier for agricultural products in general, namely relatively low income elasticity of demand.

The data presented in table 72 indicate that such trends are indeed at work in the developing countries. The two industry groups of food, beverages and tobacco, and textiles (ISIC 31 and 32) declined as a percentage of total manufacturing output for the developing countries over the First Development Decade and the downward trend was true for all three developing regions. The share of paper, printing and publishing (ISIC 34) of total manufacturing output declined somewhat, but the trend in Latin America was slightly upward for this industry group. In this decade the contribution of wood products and furniture (ISIC 33) grew, but was down slightly for Latin America, while in Asia this industry group manifested significant gains. For the developing countries as a whole, the share of the industries listed in table 72 as a percentage of total manufacturing output declined from approximately 51 to 46 per cent in the period 1960-1961 to 1968-1969.

The evolution of the importance of agricultural processing industries can be simply stated. In primitive economies the food and fibre are grown, processed and consumed to a large extent within the same units. As economic development begins, the growing division of labour leads to an increasing physical separation of the processing from primary production units. Initially, the agricultural processing industries account for the bulk of output in the incipient manufacturing sector. However, after some threshold level is crossed, the processing of food and fibre generally becomes increasingly of less relative importance in the total manufacturing output. This cycle of evolution is not evident for the dependence of agriculture on industry, however. As the agricultural sector modernizes, it becomes more and more dependent on manufactured inputs. For example, land accounted for 41 per cent of agricultural

[140] It should be noted, however, that textiles and furniture manufacturing also involve transformation of some non-agricultural materials.

TABLE 70. MANUFACTURING VALUE ADDED OF LEATHER AND PRODUCTS OF LEATHER, LEATHER SUBSTITUTES AND FUR, EXCEPT FOOTWEAR AND WEARING APPAREL (ISIC 323), 1960—1968

(Million dollars)

	1960	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*
World	2,591	2,693	2,747	2,817	2,913	2,958	3,059	3,069	3,248
Developed market economies	1,508	1,577	1,592	1,636	1,679	1,677	1,720	1,642	1,723
Centrally planned economies	730	774	816	847	874	906	960	1,032	1,102
Developing countries	353	342	339	334	360	375	379	395	423
Asia	67	72	81	91	95	91	91	96	101
Latin America	267	252	238	223	244	261	264	274	295
Africa	19	18	20	20	21	23	24	25	27

Source: UNIDO, based on data supplied by the United Nations Statistical Office.

TABLE 71. AVERAGE ANNUAL RATES OF GROWTH OF MANUFACTURING INDUSTRIES PROCESSING AGRICULTURAL RAW MATERIALS

(Per cent)

	1955–1960	1960–1965	1965–1969
Food, beverages and tobacco (ISIC 31)			
World	4.7	4.8	4.5
Developed market economies	3.8	3.9	3.5
Centrally planned economies	7.7	6.5	5.4
Developing countries	5.4	4.4	4.8
Latin America	4.6	4.3	4.0
Africa	...	...	...
Asia	5.5	4.2	6.6
Textiles (ISIC 32)			
World	4.3	4.1	4.5
Developed market economies	3.2	3.7	3.9
Centrally planned economies	6.3	3.7	6.7
Developing countries	3.9	4.7	3.7
Latin America	2.3	3.9	2.7
Africa	...	...	...
Asia	3.9	5.2	4.0
Wood products and furniture (ISIC 33)			
World	5.7	5.5	4.3
Developed market economies	2.9	4.9	3.2
Centrally planned economies	11.1	6.4	6.4
Developing countries	6.5	9.2	4.3
Latin America	4.4	4.0	4.4
Africa	...	...	...
Asia	9.7	14.3	4.9
Paper, printing and publishing (ISIC 34)			
World	5.3	5.1	5.5
Developed market economies	5.0	5.1	5.3
Centrally planned economies	7.1	7.1	8.1
Developing countries	7.9	7.0	5.8
Latin America	6.5	7.1	6.2
Africa	...	...	...
Asia	12.5	9.0	7.8

Source: UNIDO, based on data supplied by the United Nations Statistical Office.

output in China (Taiwan) in the mid-1960s but for only 15 per cent in the United States, which has such vast areas of fertile land.[141] Capital is estimated to have accounted for 67 per cent of agricultural output in the United States in this period.

Aspects of the impact of technological change on the future of processing industries

The seed-fertilizer revolution based on new wheat and rice varieties is hailed as giving many developing countries a fresh chance to promote the production of basic food grains.[142] When these improved cereals are grown,

[141] U.S. Department of Agriculture, Economic Research Service, *Economic Progress of Agriculture in Developing Nations, 1950—1968*, Foreign Agricultural Economic Report No. 59, Government Printing Office, Washington, D.C., 1970, p. 36.

[142] New corn seeds are also part of the revolution, but the extent of their use is limited compared with wheat and rice.

TABLE 72. CONTRIBUTION OF VARIOUS MANUFACTURING INDUSTRY GROUPS TO TOTAL MANUFACTURING OUTPUT, 1960—1969
(Per cent)

	1960–1961	1964–1965	1968–1969
Food, beverages and tobacco (ISIC 31)			
World	15.00	13.84	12.67
Developed market economies	12.43	11.43	10.40
Centrally planned economies	17.93	16.47	14.84
Developing countries	27.76	25.60	24.82
Latin America	28.14	27.16	26.19
Africa	31.56	30.15	...
Asia	26.49	22.72	22.41
Textiles (ISIC 32)			
World	6.17	5.51	5.04
Developed market economies	5.27	4.81	4.43
Centrally planned economies	6.10	5.13	4.69
Developing countries	14.79	13.72	12.63
Latin America	9.66	8.92	8.11
Africa	16.55	14.38	...
Asia	21.59	19.59	17.69
Wood products and furniture (ISIC 33)			
World	4.32	4.14	3.80
Developed market economies	4.21	4.04	3.69
Centrally planned economies	4.76	4.41	4.01
Developing countries	3.63	3.98	4.04
Latin America	3.15	2.92	2.80
Africa	5.88	5.82	...
Asia	3.87	4.94	5.37
Paper, printing and publishing (ISIC 34)			
World	6.25	5.89	5.56
Developed market economies	8.54	8.14	7.91
Centrally planned economies[a]	1.11	1.06	...
Developing countries	4.66	4.65	4.57
Latin America	5.12	5.25	5.30
Africa	3.48	4.14	...
Asia	4.24	3.99	3.98

Source: UNIDO, based on data supplied by the United Nations Statistical Office.
[a] Excluding printing and publishing.

using fertilizers and other appropriate inputs, large increases in yield may result. This prospect has been particularly attractive to countries that have been importing sizable quantities of cereals and has been the basis for import-substitution policies in agriculture.[143] There are, however some severe constraints on the ability of cereal-based agriculture to serve as a key factor in long-term economic growth.

[143] It should be noted that the use of subsidies and various incentive packages to promote import substitution in agriculture may have hidden costs similar to those experienced in industrialization through import substitution. Whereas a number of important studies have been made of the effective rate of protection of domestic manufacturing, this has not been adequately studied for agriculture.

It has been pointed out that increases in agricultural output entail increased reliance on manufactured inputs and this is even more emphatically the case with the new seed varieties. The provision of a suitable physical environment, free from drought and flooding with an assured, adequate and controlled water supply, is necessary as are adequate supplies of such inputs as fertilizers and other agricultural chemicals. Further, an efficient marketing system is required to handle drying, milling, storing and transport. It is thus apparent that shortages of manufactured inputs will serve as a constraint on the adoption and/or productivity of the new seeds. Where no domestic capacity exists, these inputs may have to be imported. The extent of foreign-exchange reserves and alternative priority uses for them may place limits on this possibility, however.

Another constraint is likely to be of great importance within the next several years. For many countries at present national self-sufficiency in cereal grains is a priority goal.[144] Countries that are able to achieve self-sufficiency in cereals may regard the export market as a next stage, but pursuance of the goal of self-sufficiency tends to dry up the export markets. According to FAO, "there is overwhelming evidence . . . that the world cereals productive capacity is far in excess of foreseeable demand and a growing possibility that by 1985 the problem of over-production might begin to affect developing regions as it already does the high-income countries".[145] This obviously places some limits on the growth prospects of cereal-based agriculture.

Finally, in the context of the national economy it has been found that as *per capita* income rises, the pattern of demand for food products shifts away from cereals and towards meat, poultry, vegetables and fruits. These latter require to some extent a different set of inputs, and the output has a different relationship to the manufacturing processes as well as to the market.

Technical advances in the manufacture of food products and textile fibres[146]

It is generally thought that the developing countries are comparatively more efficient in the production of primary products than of manufactures. To whatever extent this is true, some technological advances in textiles and food processing have created considerable problems for these countries. The growing importance of man-made cellulosics and synthetic fibres tends to shift textile production from the less developed countries to the more developed. In 1954 only a little more than 12 per cent of the world output of apparel yarns were synthetic, but by 1966 about 17 per cent consisted of man-made fibres (cellulosics). While cellulosics can be produced from materials indigenous to many developing countries, e.g. wood pulp and cotton linters, the production of synthetics requires petrochemicals. An additional obstacle to the entry of the developing countries into the production of synthetics is the fact that the extensive research applied

[144] L. Brown, *Seeds of Change: The Green Revolution and Development in the 1970's*, Pall Mall Press, London, 1970, p. 157.

[145] FAO, *Provisional Indicative World Plan for Agricultural Development*, Vol. II, p. 542.

[146] Forest products are of course a part of agricultural output. The demands of space, however, do not permit treatment of this important sector separately.

by the existing industry develops new materials and processes at a rapid rate which might cause a developing country's investment to become obsolete long before the physical equipment was worn out. Also, as a result of large-scale production there is generally a downward price trend for synthetics.[147]

In the area of food processing, the increasing sophistication and specialization of the consumer in the developed economies has been both the cause and result of rapid changes in food-processing technology. As *per capita* incomes in the developed economies have risen rapidly, the demand for convenience and for high quality have had a great impact directly on food processing and derivatively on the organizational structure of agriculture. These trends in the developed countries are important to the developing countries for two reasons. First, as the developing countries experience sustained growth in *per capita* income the new consumer habits will probably be reflected in the domestic demand for food. The second reason is of more immediate concern. As was noted earlier, food and beverages tend over a period to decline as a proportion of manufactured output as economic growth progresses. If a developing country finds that most of its domestic resources and long-run potential seem to lie in agriculture and its prospects for industrialization appear best in food processing, it might be well advised to look to the international market.[148] Even countries that have a diversified resource base may wish to exploit the potential for agricultural processing to the fullest extent by producing those processed food products that show growth prospects on the world market. To compete in that market, however, paramount consideration must be given trends in quality and convenience.

"There is a trend in food manufacturing towards building larger and fewer factories to keep unit costs down through highly mechanized, automated, high-capacity production."[149] The low unit costs resulting from modern technology must be weighed carefully by the developing countries in arriving at their investment decisions.[150] There are several other prominent trends in food processing which are especially noticeable in the developed market economies and which must be considered by a country contemplating entry into that market. Convenience foods, foods of gourmet quality and snack foods are becoming increasingly popular. The concentration of foods to cut storage and transportation costs, and pre-blending, are both important trends in the international markets and will also become important in the domestic markets of the developing countries.

For the developing country that contemplates entry into these growing markets for processed foods, the problems to be faced are complex and sizable.

[147] UNIDO, *Textile Industry*, Monographs on Industrial Development No. 7.

[148] If the climate allows, production might be oriented towards such traditional crops as bananas and coffee, but the manufacturing content will be low and the international markets tend to be saturated and the competition stiff.

[149] UNIDO, *Food Processing Industry*, Monographs on Industrial Development No. 9, p. 15.

[150] In some cases there may be the possibility of utilizing relatively labour-intensive techniques if the resulting output is competitive in terms of both unit costs and quality. Certain functions of a partly automated process may be made labour intensive where local factor prices warrant, packaging being one of the most logical.

These include organizing the output of private farmers, controlling the quality of both the raw material and the final product, keeping up with changing consumer preferences, and finding market outlets at a price that often has to compete with that of output from ultramodern enterprises in developed countries. For the developing country with scattered small farms, little or no agricultural extension service, poor transportation, few storage facilities, underdeveloped marketing facilities, and no experience with world markets for modern processed food products, the problem might understandably be viewed as monumental. It is possible, however, for a developing country to minimize all of the foregoing problems and place its processed food products in the hands of consumers around the world.[151] The key that for many countries may open the door to this opportunity is integrated food processing.

By the phrase integrated food processing is meant the vertical integration of all the various stages, beginning with production of the raw material, through the steps of processing, and culminating with marketing the product. Vertical integration requires that to the extent possible all stages of the production process be planned, organized and managed by one organization, which may be viewed as an industrial combine and which utilizes an industrial approach to meet a proven demand for its products. The organization and direction of such an integrated operation needs considerable managerial inputs, usually a scarce factor in the developing countries. On the other hand, the integrated approach undoubtedly requires less in terms of organizational structure and administrative talent than a programme that attempts to base processing industries on smallhold agriculture assisted by agricultural extension services and decentralized collection stations, credit, input distribution etc. Investment in integrated food processing is made on the basis of established market opportunities. It is a mistake to limit project identification to industries for processing an existing agricultural surplus or expected surpluses from existing crops. This procedure unduly restricts the operation to the processing of traditional crops for which market prospects may not be bright, and it overlooks the possibilities of producing to meet growing demand for processed food products for which there may be no recent crop history but for which soil and climate are appropriate. An important way of approaching project identification is to study the potential markets of the developed countries and, on the basis of trends, select those products that show the greatest growth potential and for which local climatic and soil conditions are favourable.[152] The process is then organized on the basis of supplying a high-quality product at a sufficiently low price to ensure successful entry into the existing market.

The assurance of high quality requires more than attention to the selection of the proper manufacturing process and the acquisition of good equipment. The location of the plant and the organization of crop production are of vital importance. When the raw material is highly perishable, as is the case with

[151] Some additional problems attending this strategy are tariffs, preference schedules and non-tariff distortions, all of which are discussed in chapter II.

[152] Through water-management systems and the application of plant nutrients the physical environment for crops production can be manipulated within certain limits.

most fruits and vegetables, the processing facilities must be near the source of raw material supply. "A tomato cannery, for example, must be close enough to the field so that the tomatoes can be transported to it in a matter of hours after harvesting. For prime quality, green peas should be in the processing plant within an hour or so after picking and be frozen or canned within three or four hours."[153] Inability to meet these requirements results in forfeiting the chance to sell in the growing markets of the developed countries, which account for the bulk of consumption of such processed food products. In addition to the necessity to move the crop quickly from the field to the processing plant, the raw material must be of a uniformly high quality. These requirements place rigid constraints on the possibilities for the organi. ation of the production of raw materials. It is doubtful therefore that a modern food-processing industry could be established on a base of traditional agriculture.

In many developing countries the majority of the agricultural population works on very small holdings that are often fragmented, and participates in the market economy only to the extent that a particular crop produces a surplus over domestic requirements. With very low per family incomes there is little chance for them to accumulate capital to improve their situation significantly. These agriculturists do not have a working knowledge of the newer plant varieties and cultivation techniques, nor is credit available to enable them to acquire the new inputs. In the many countries where *per capita* GDP is very low and where the majority of the population is engaged in agriculture, it will take several generations before domestic resources can provide for adequate research, extension services and credit facilities to transfer the majority of the agricultural population from the traditional sector to the modern. Traditional agriculture is often dependent on rainfall and a scarcity or surplus of rain can drastically reduce the volume and often the quality of output. To ensure that the crop is of sufficient quality and delivered so as to facilitate processing, there must therefore be some form of centralized control over the seeds and other inputs used, the planting and harvesting dates and often the management of water. To achieve this control the structure of traditional agriculture must be modernized. An agricultural organization that achieves vertical integration can upgrade its share of the agricultural sector in a small fraction of the time required through the general provision of extension services, credit and the like. Thus one organization that controls all stages of the production process from the field to the final consumer may greatly compress the time required to modernize agriculture.

The investment in integrated organization is based on studies showing a firm market; the processing equipment is chosen to give quality and cost efficiency adequate for competition in that market; and agriculture is organized to provide high-quality raw materials on a rigid time schedule to the processing plants. The management of the organization provides its agricultural work force with

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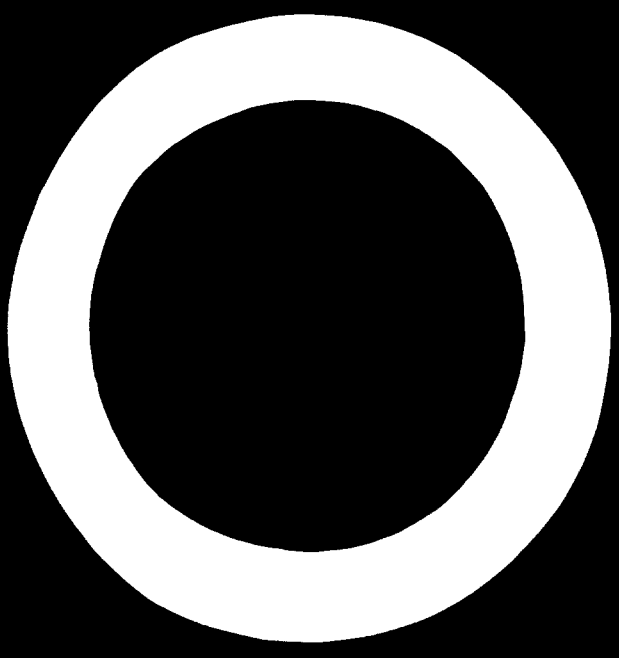
[153] UNIDO, *Food-Processing Industry*, p. 6. While many factors influence the location of food-processing plants, such as power and water availability, trained labour, housing etc., proximity to the raw material is paramount with highly perishable crops. The location of grain mills, however, may depend more heavily on the other factors.

seeds, chemical inputs, water and transportation, and exercises quality control throughout. In such an operation the production of the raw material is an integral part of a unified process. To organize on a disaggregated basis would very likely mean that the manufacturing process could not operate profitably.

Often the organization of food-processing production should go beyond the provision of the basic crop and its processing. One of the most important developments in food technology is the organization of production, and the degree and rate of progress in this area in the developed countries has had such an impact on efficiency that if developing countries wish to compete in the world markets they must match the developed countries in cost efficiency. To do this each project must take advantage of all feasible linkages, in addition to the aforementioned vertical integration. This means that by-products must be utilized to the fullest extent possible and ancillary inputs must be produced when possible. As an example, when the processing of meat is considered the basic project, the feasibility of several related projects should be considered in addition to the integration of cattle production with meat processing and marketing. Cattle feed might be produced from oil-bearing seeds which can be produced by the combine. To assure that cattle attain weight on schedule and that they are of desired quality, the provision of high-quality feedstuffs is necessary. Because of transportation costs domestic production is mandatory and its location within the combine is desirable. The production of oil-seeds would also allow for the production of vegetable oil and vegetable-oil products. Further, a tannery might be set up to utilize the animal hides. The animals from a well managed combine would be of high quality, whereas tanneries in developing countries often experience difficulty with the hides of animals raised by scattered small holders and slaughtered in local abattoirs. Thus, in addition to the production of one raw material, two raw materials, cattle and oil-seeds, are produced and in addition to one manufacturing plant, there may be three, meat processing, oil processing and a tannery. There might also be a plant for producing margarine and/or vegetable-oil shortening and one or more plants for producing leather products. In such a combine meat products may for practical purposes be considered a by-product. Whereas if taken singly a meat-products industry might have been of doubtful profitability, the combine might show a reasonable return on investment and market its meat products at a competitive price.

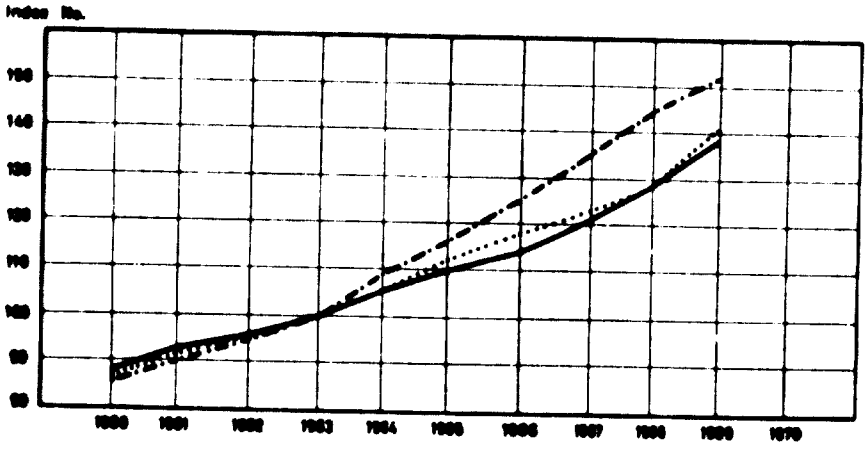
Thus, the integration of the complete food-production process from the field to the final consumer allows a developing country to compete in the growth markets of the developed countries. Such an organization provides for centralized planning and management of all aspects and for quality control throughout the process. The farm as well as the factory use modern management techniques, which build into the project agricultural research and extension services, credit, transportation and infrastructure. Further, through linked projects the timely and economic provision of vital inputs is assured and waste products are utilized. While it may be argued that for such an investment the resources required are substantial, especially in terms of skills, these requirements are small compared to those that would be necessary to sufficiently upgrade traditional agriculture and also to provide the required infrastructure.



Annex

ECONOMIC INDICATORS

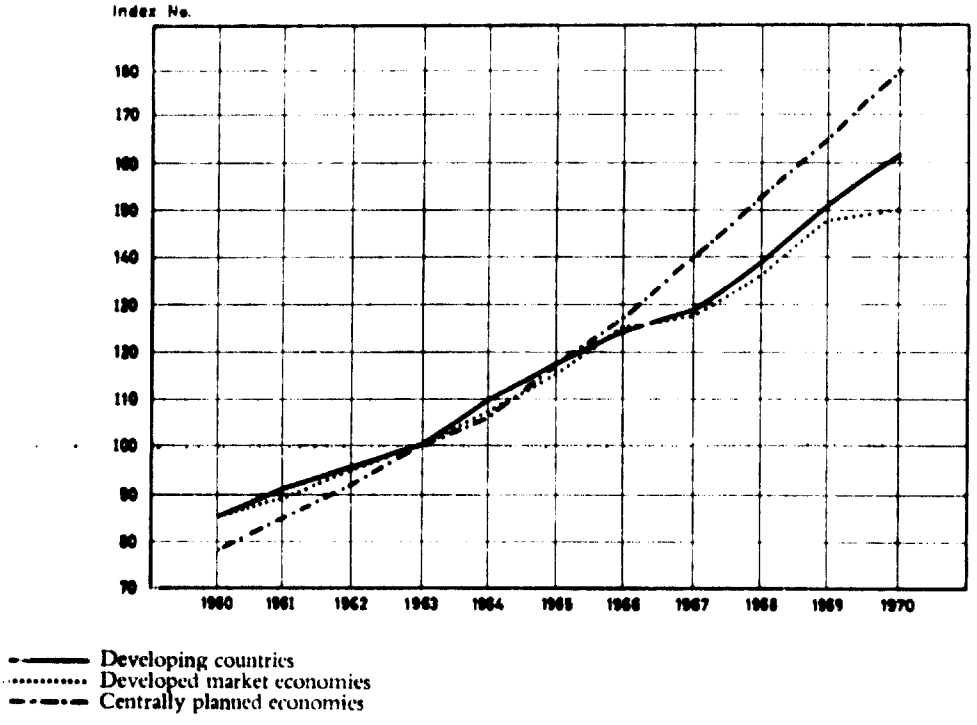
1. Growth of gross domestic product by economic grouping, 1960—1969
(1963 = 100)



Developing countries
Developed market economies
Centrally planned economies (excludes services)

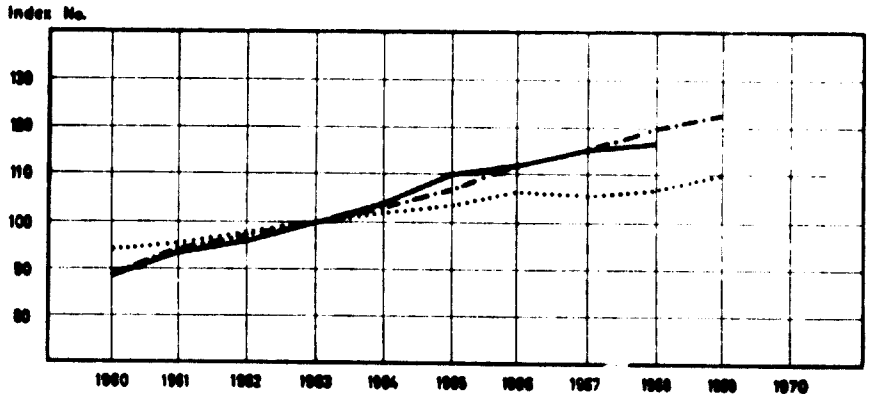
Source: United Nations, *Yearbook of National Accounts Statistics.*

2. Manufacturing output (ISIC 3) by economic grouping, 1960–1970
(1963 = 100)



Source: United Nations, *Statistical Yearbook* and *Monthly Bulletin of Statistics.*

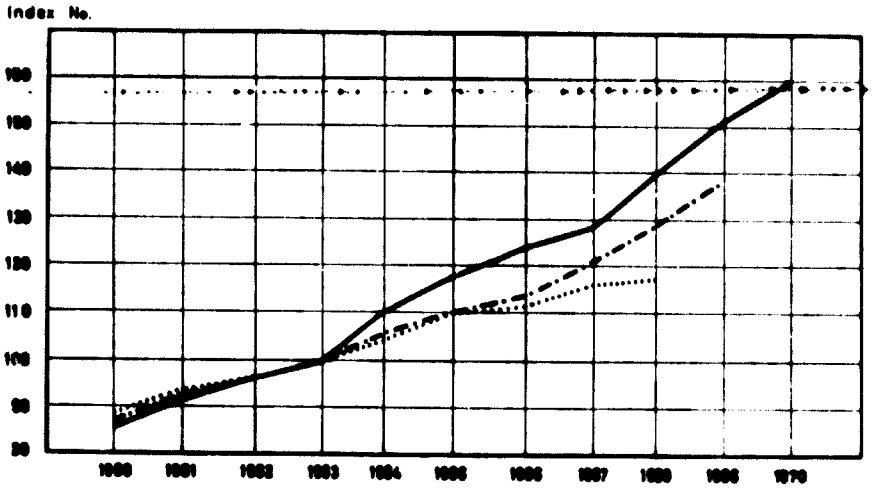
3. Manufacturing employment (ISIC 3) by economic grouping, 1960—1969
(1963 = 100)



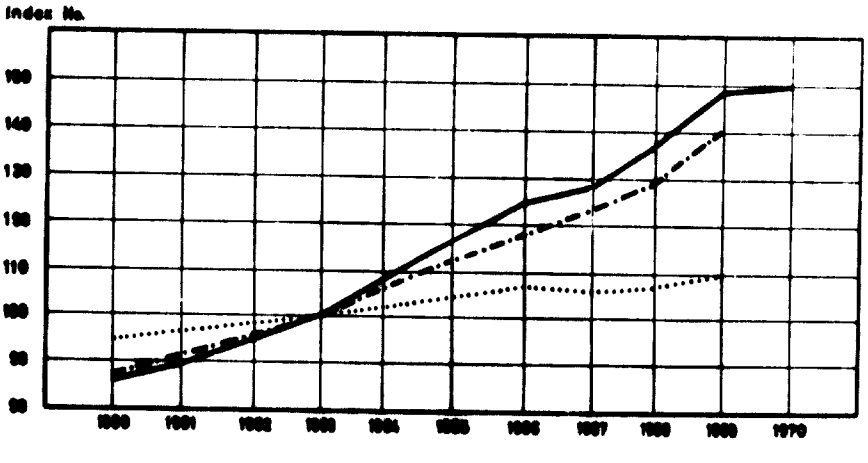
Source: United Nations, *Statistical Yearbook* and *Monthly Bulletin of Statistics.*

4. Manufacturing output, employment and GDP, 1960—1970
(1963 = 100)

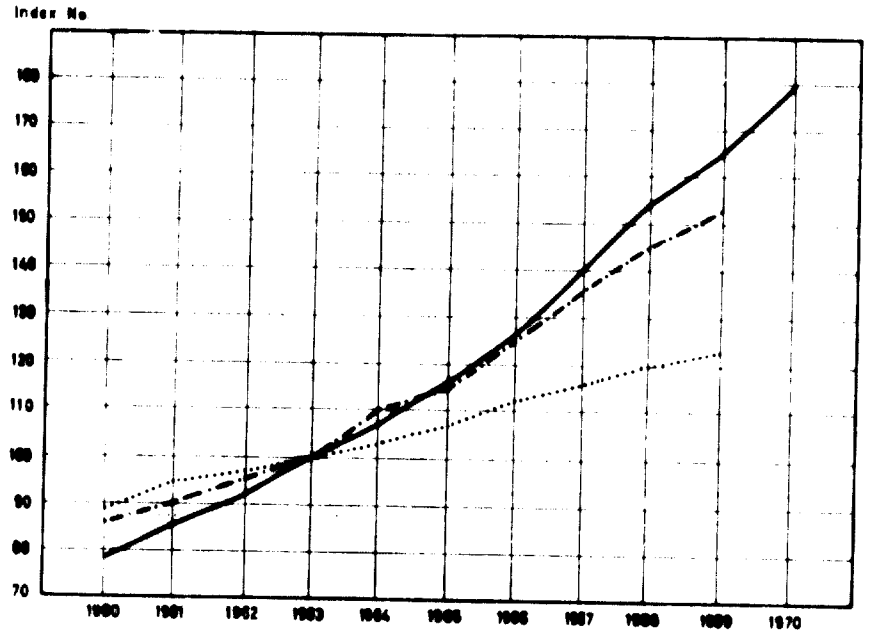
(a) Developing countries



(b) Developed market economies



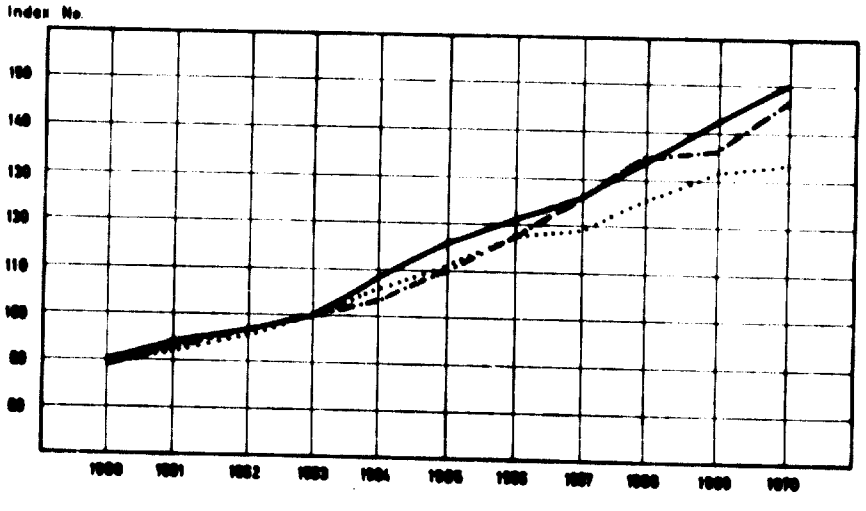
(c) Centrally planned economies



Manufacturing output
Manufacturing employment
GDP

Source: United Nations, *Yearbook of National Accounts Statistics*, *Statistical Yearbook* and *Monthly Bulletin of Statistics*.

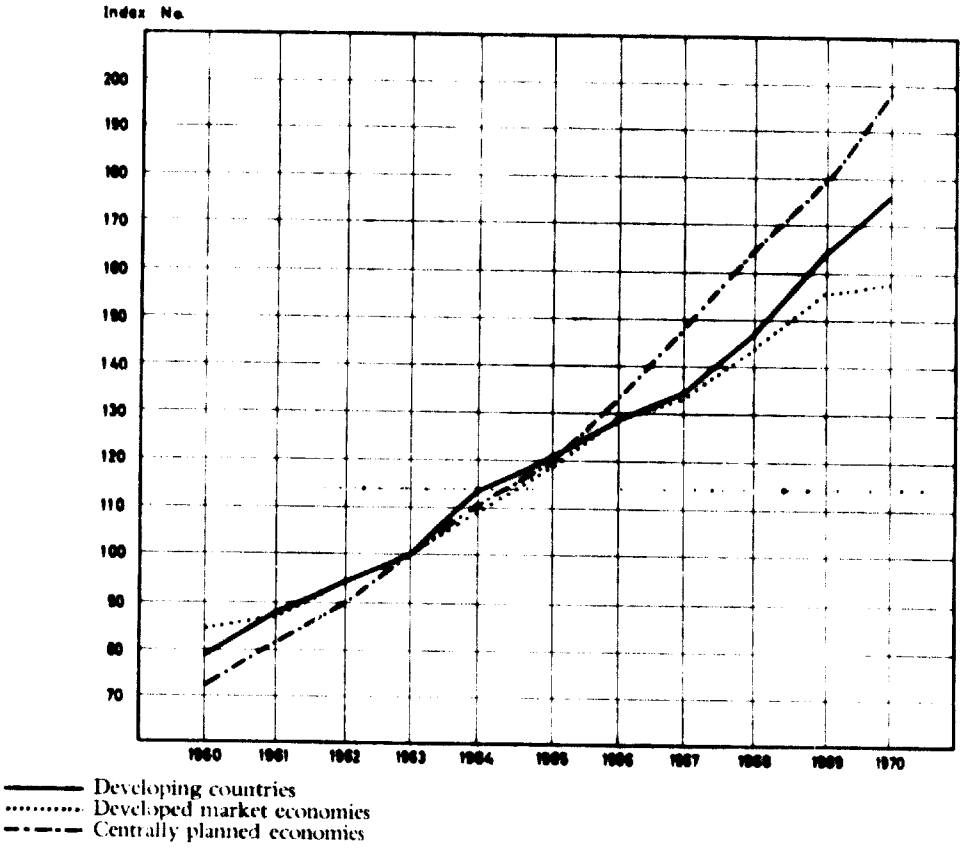
5. Light manufacturing output (ISIC 31—33, 342, 355—356, 39) by economic grouping, 1960—1970
(1963 = 100)



Developing countries
Developed market economies
Centrally planned economies

Source: United Nations, *Statistical Yearbook* and *Monthly Bulletin of Statistics*.

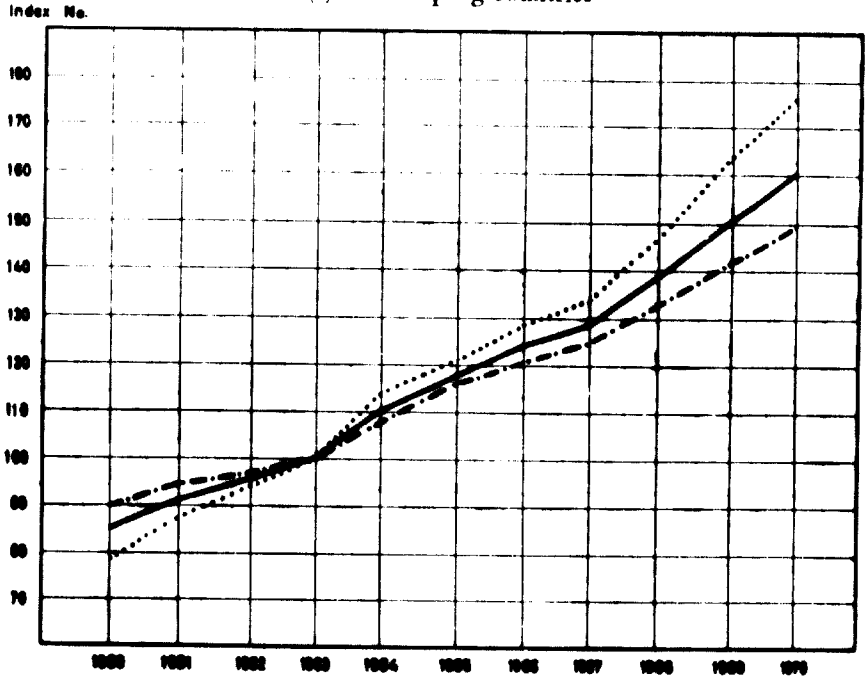
6. Heavy manufacturing output (ISIC 341, 351—354, 36—38) by economic grouping, 1960—1970 (1963 = 100)



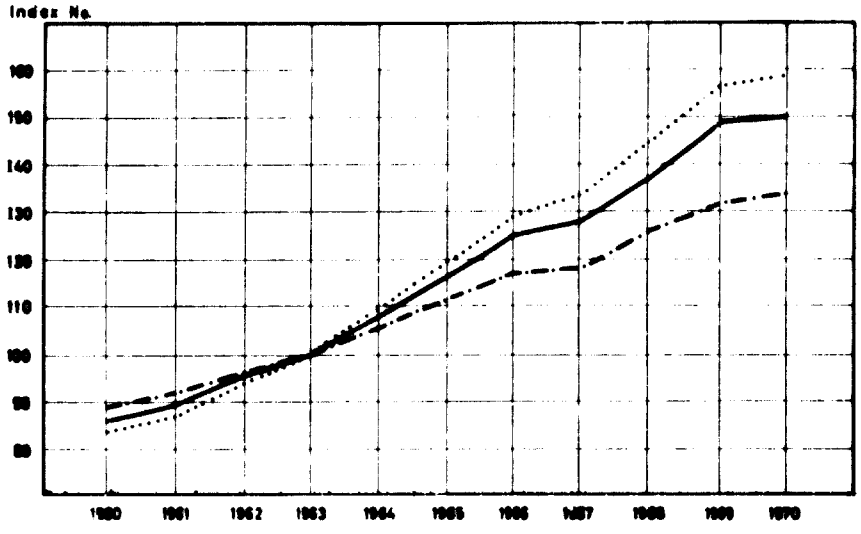
Source: United Nations, *Statistical Yearbook* and *Monthly Bulletin of Statistics.*

7. Manufacturing output, 1960—1970 (1963 = 100)

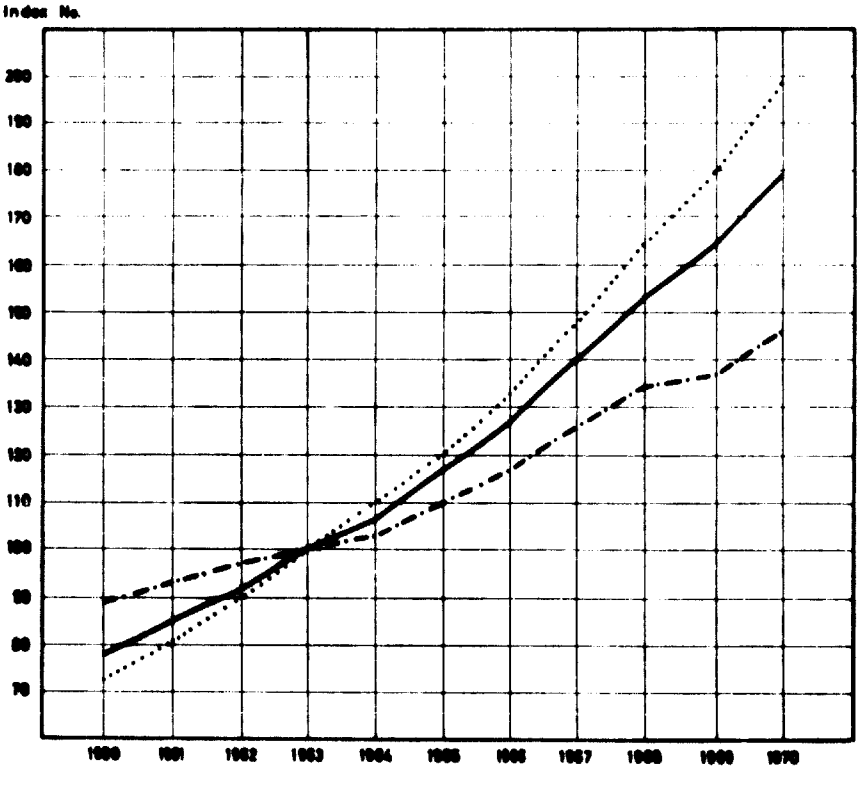
(a) Developing countries



(b) Developed market economies



(c) Centrally planned economies

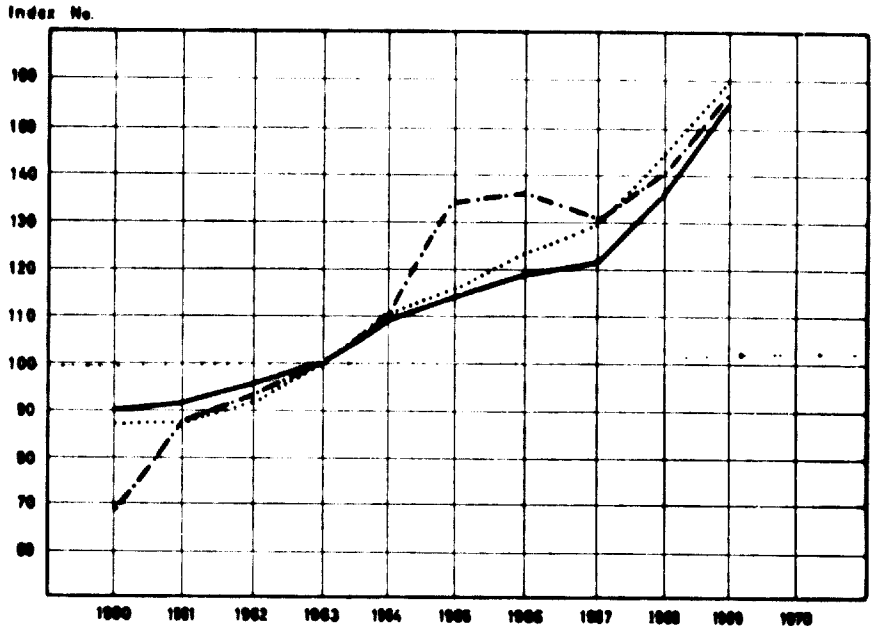


Total manufacturing output
Heavy manufacturing output
Light manufacturing output

Source: United Nations, *Statistical Yearbook* and *Monthly Bulletin of Statistics.*

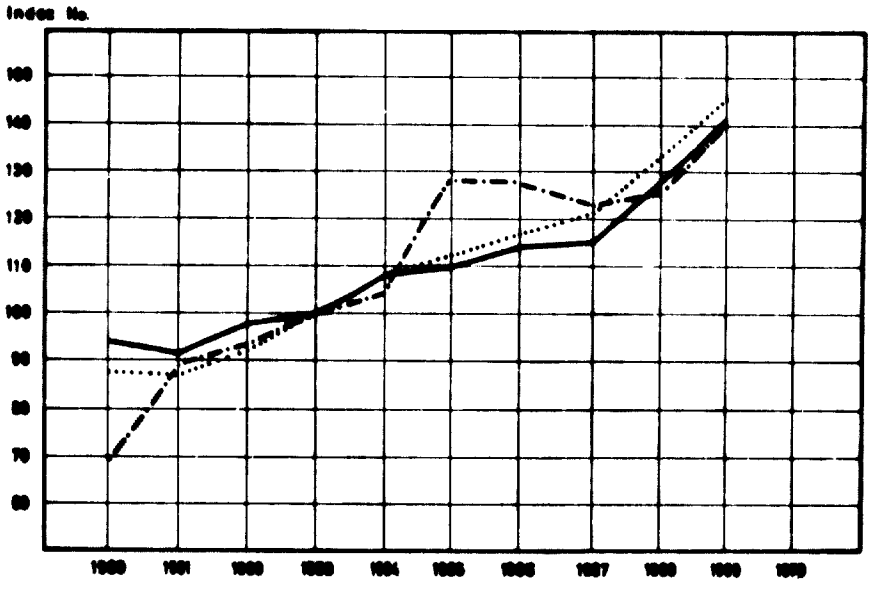
8. Destination of exports from developing countries, 1960—1969
(1963 = 100)

(a) Exports SITC 0—9



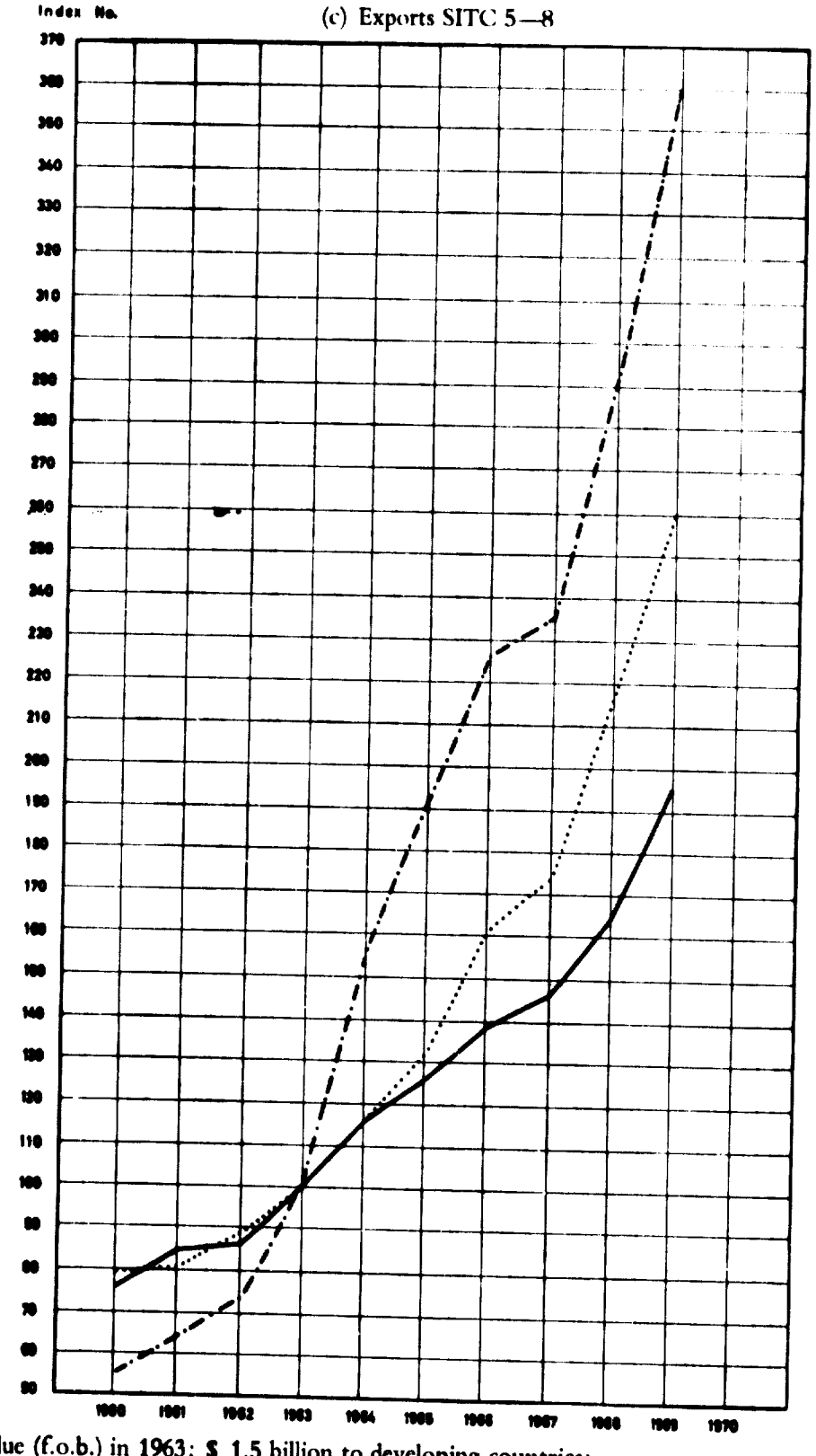
Value (f.o.b.) in 1963: $ 6.7 billion to developing countries;
$22.8 billion to developed market economies;
$ 1.4 billion to centrally planned economies.

(b) Exports SITC 0—4



Value (f.o.b.) in 1963: $ 5.1 billion to developing countries;
$19.5 billion to developed market economies;
$ 1.3 billion to centrally planned economies.

(c) Exports SITC 5—8



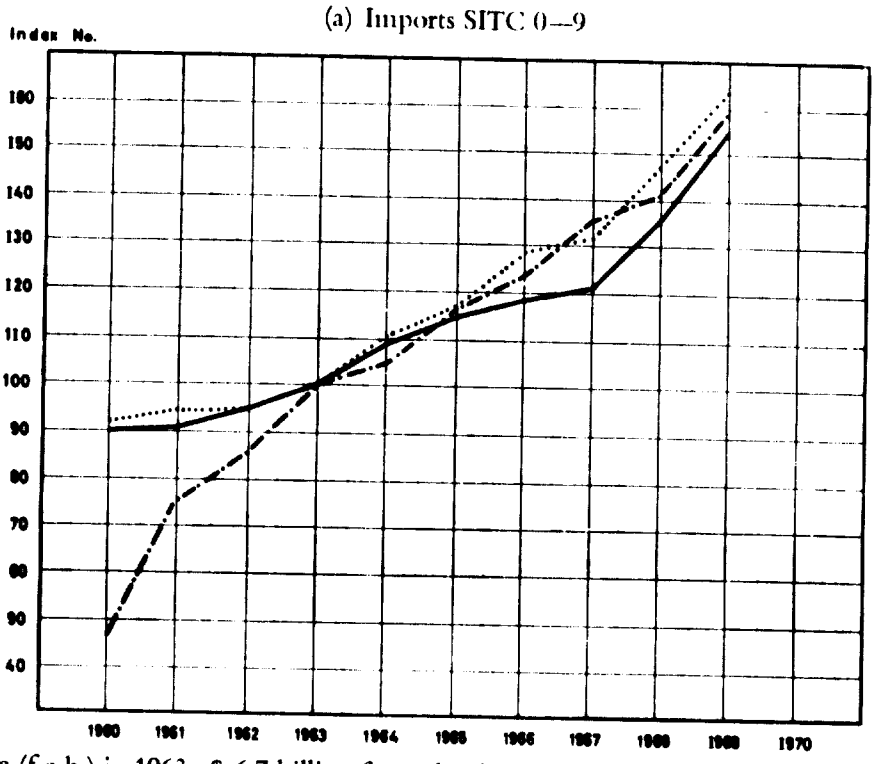
Value (f.o.b.) in 1963: $ 1.5 billion to developing countries;
$ 3.2 billion to developed market economies;
$ 0.1 billion to centrally planned economies.

——— Developing countries
····· Developed market economies
– · – · – Centrally planned economies

Source: United Nations, *Statistical Yearbook* and *Monthly Bulletin of Statistics.*

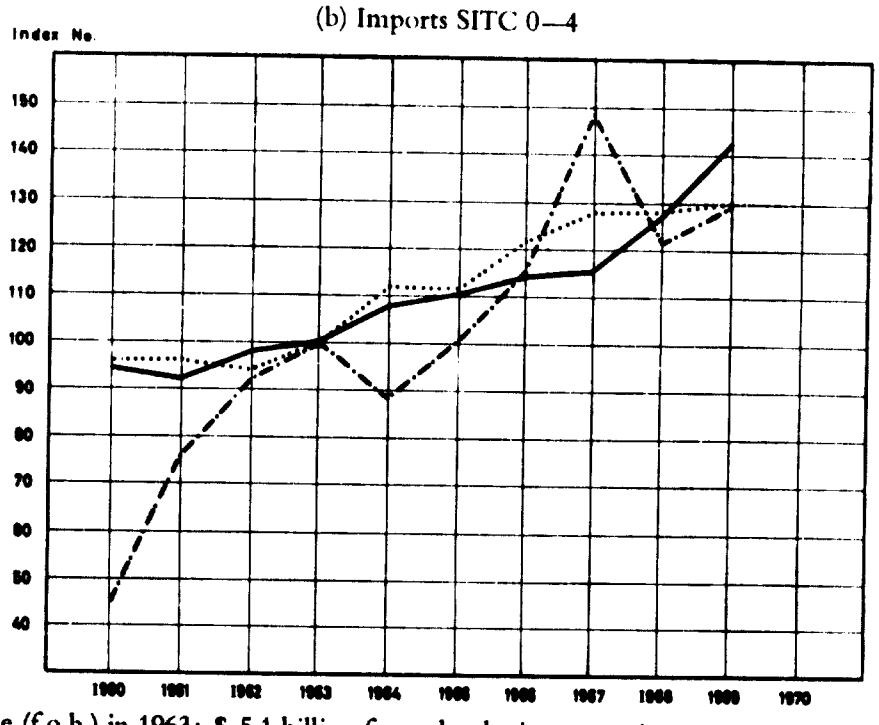
9. Source of imports to developing countries, 1960–1969
(1963 = 100)

(a) Imports SITC 0—9



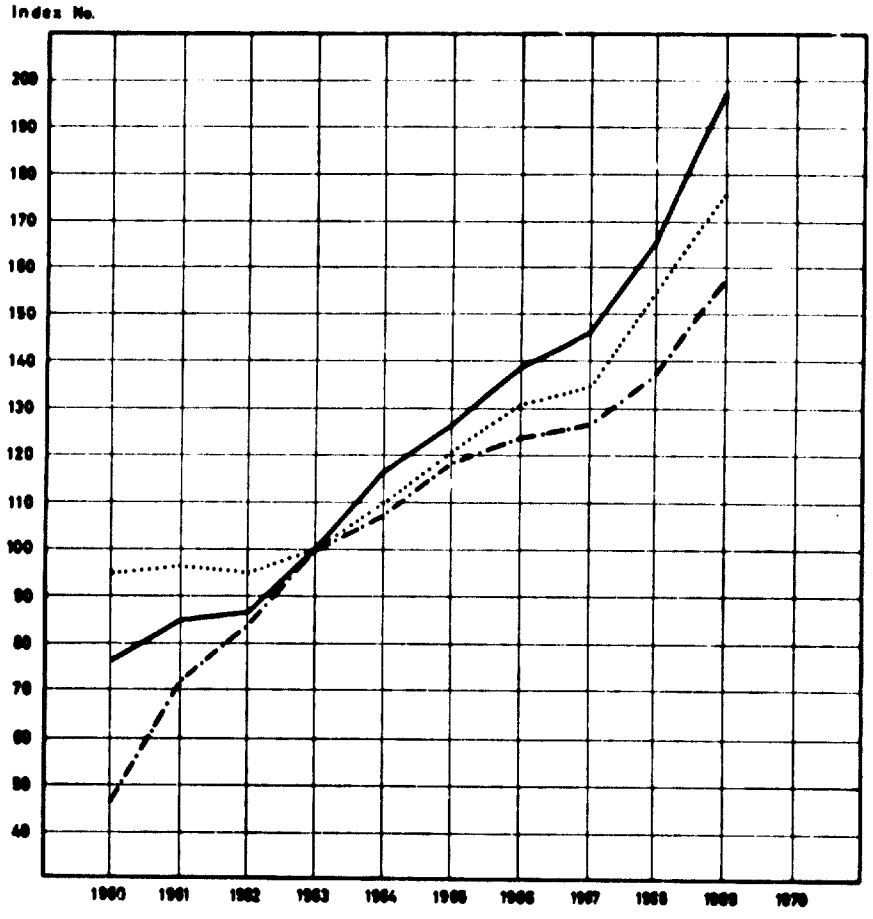
Value (f.o.b.) in 1963: $ 6.7 billion from developing countries;
$23.0 billion from developed market economies;
$ 1.8 billion from centrally planned economies.

(b) Imports SITC 0—4



Value (f.o.b.) in 1963: $ 5.1 billion from developing countries;
$ 4.7 billion from developed market economies;
$ 0.5 billion from centrally planned economies.

(c) Imports SITC 5—8



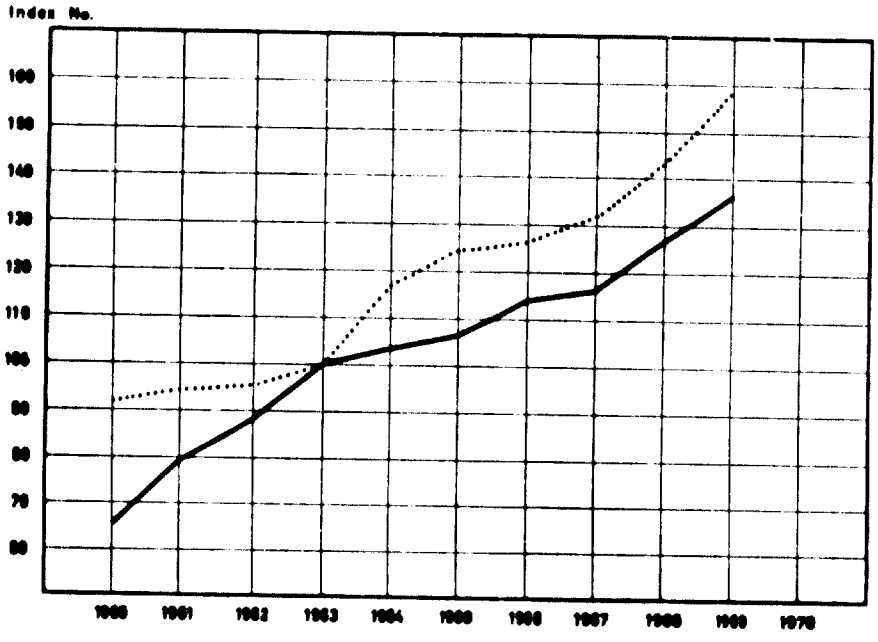
Value (f.o.b.) in 1963: $ 1.5 billion from developing countries;
$17.3 billion from developed market economies;
$ 1.3 billion from centrally planned economies.

——— Developing countries
····· Developed market economies
— · — · — Centrally planned economies

Source: United Nations, *Statistical Yearbook* and *Monthly Bulletin of Statistics.*

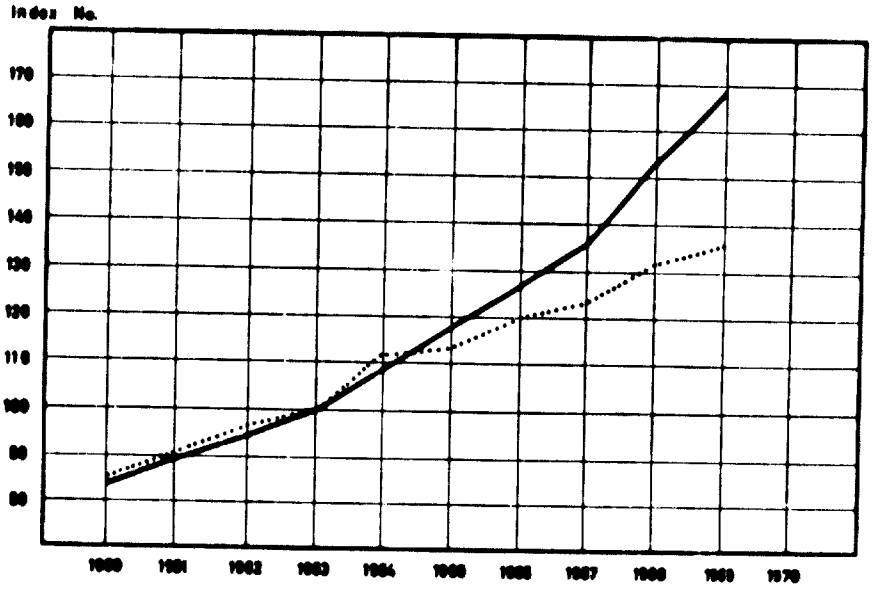
10. Production of selected industrial products, 1960—1969
(1963 = 100)

(a) Pig-iron and ferro-alloys



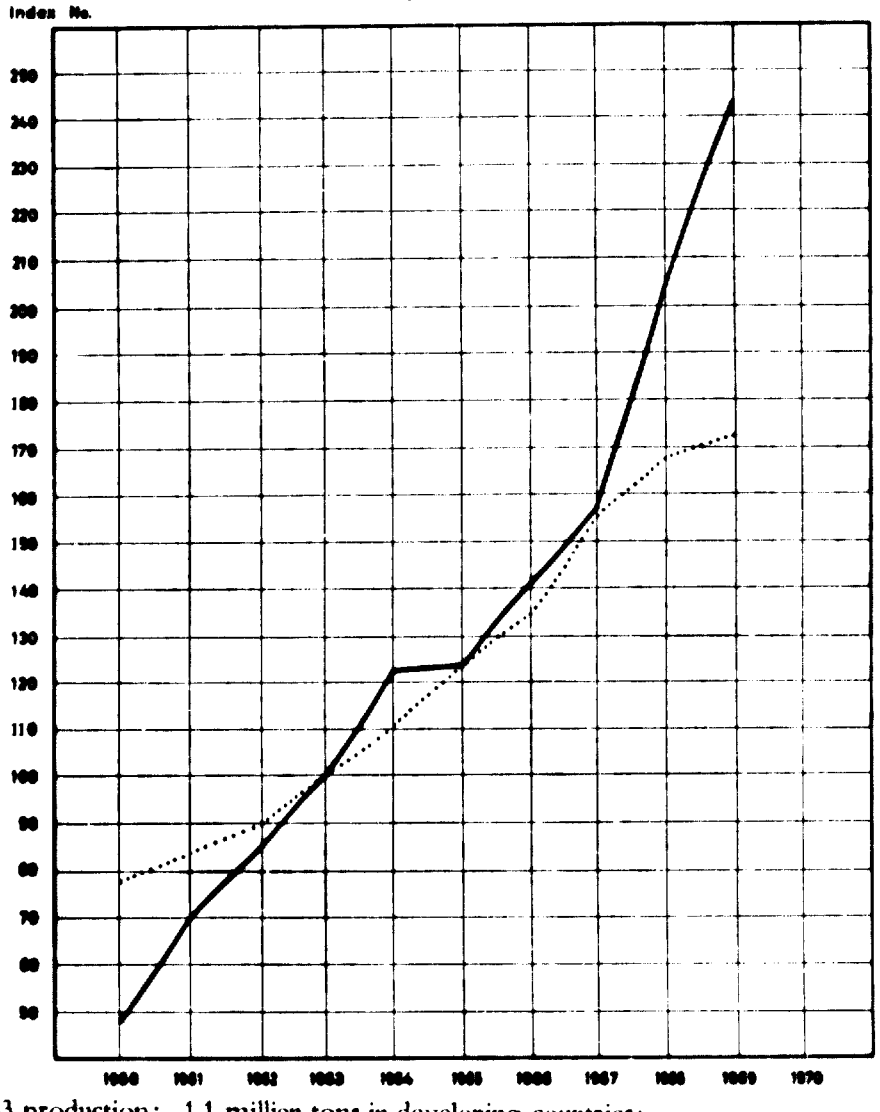
1963 production: 12 million tons in developing countries;
175 million tons in developed market economies.

(b) Cement



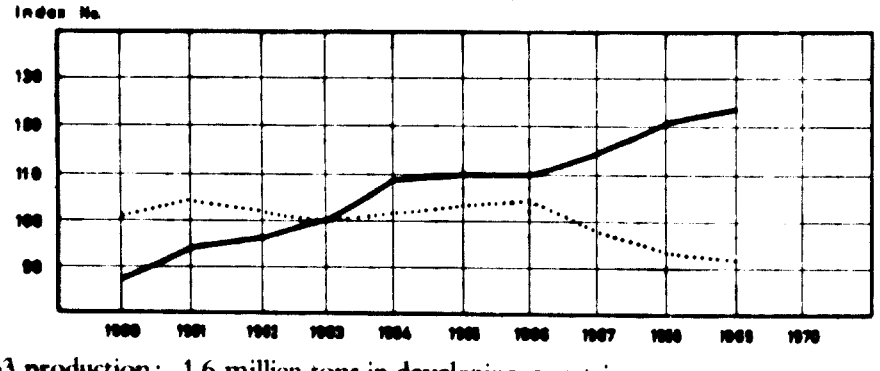
1963 production: 49 million tons in developing countries;
225 million tons in developed market economies.

(c) Nitrogenous fertilizers



1963 production: 1.1 million tons in developing countries;
10.9 million tons in developed market economies.

(d) Cotton yarn

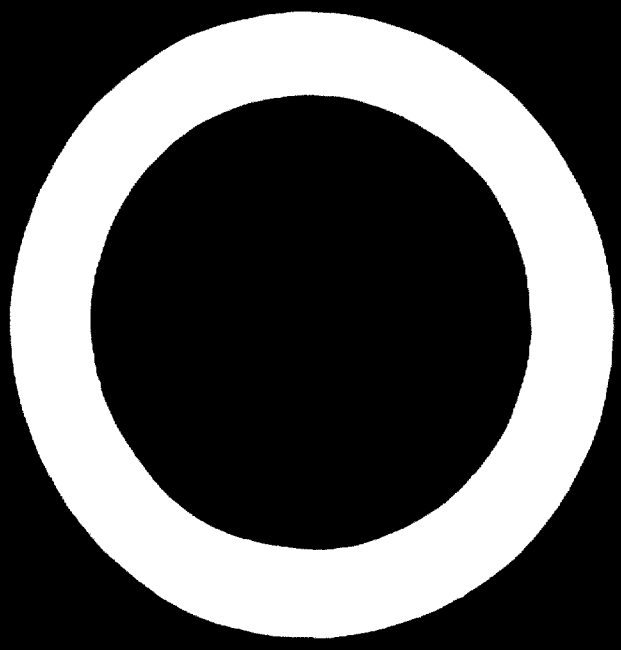


1963 production: 1.6 million tons in developing countries;
4.0 million tons in developed market economies.

——— Developing countries
····· Developed market economies

Source: United Nations, *Statistical Yearbook* and *Monthly Bulletin of Statistics*.

RVEY



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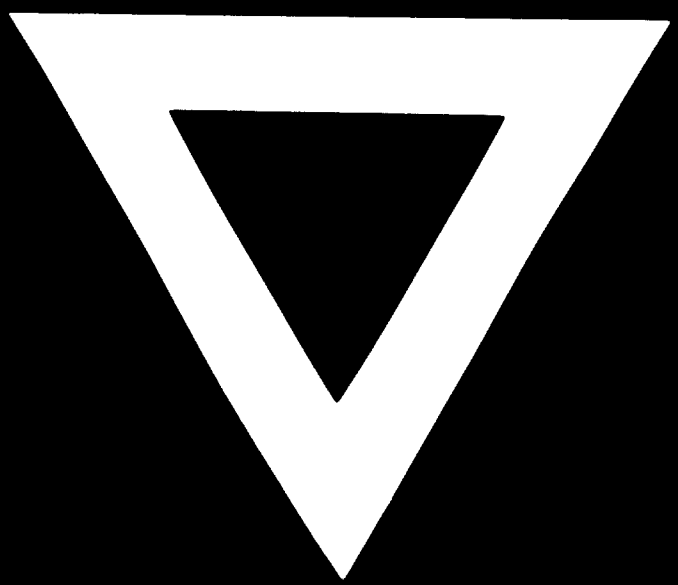

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