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PROGRAMME OF ACTIVITIES FOR THE IMPLEMENTATION
OF THE PREPARATORY PHASE (1982-1984) OF IDDA

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PROGRAMME OF ACTIVITIES FOR THE IMPLEMENTATION OF THE PREPARATORY
PHASE, 1982-1984, OF THE INDUSTRIAL DEVELOPMENT DECADE FOR AFRICA

INTRODUCTION

Expected outputs during the preparatory phase

1. The Conference of African Ministers of Industry, at its sixth meeting in November 1981, 1/ concluded that the actions to be undertaken during the preparatory phase (1982-1984) of the Decade would include:

(a) preparing a coherent and internally consistent set of national, sub-regional and regional policies, master plans and programmes, as well as designing and promoting institutional machinery to achieve the objectives of the Decade in particular and the Lagos Plan of Action in general; 2/

(b) popularizing the Decade Programme, including the effective use of the mass media; 2/3/

(c) elaborating investment programmes and projects at the national, sub-regional, 2/3/ regional and international levels for submission to financial and investment institutions and a programme to strengthen or establish national, subregional and regional financial institutions as required;

(d) preparing an industrial manpower development plan including, in particular, a programme for the training of specialized African industrial and technological skills, at the national, subregional and regional levels;

(e) adopting policy instruments to foster intra-African industrial co-operation, 2/3/ especially in the areas of trade, technology, promotion of African specialization and complementarity, raw material assessment, project financing, manpower development, entrepreneurial capabilities, information, consultancy services, and energy; and

(f) establishing an African industrial consultation negotiation, and arbitration mechanism within the framework of the Final Act of Lagos.

1/ See Report, ECA/CMI.6/INR/8, Part Two, paragraph 10.

2/ See "Guidelines for initiating priority actions at the national and subregional levels, 1982-1984, for the implementation of IDDA", ECA/FCIA.7/INR/WP/3.

3/ See also "Review of modalities for the implementation of IDDA at subregional and regional levels" ECA/FCIA.7/INR/WP/4 and Progress and actions taken towards the implementation of Industrial Development Decade, ECA/FCIA.7/INR/WP/1.

2. In elaborating upon the above actions, the Joint Committee of the OAU, ECA and UNIDO secretariats in the implementation of the programme for the Industrial Development Decade for Africa noted the following considerations which should be accounted for on the first phase:

(a) Contribution to the basic policy objective of collective self-reliance and self-sustaining development;

(b) Promotion of the development of indigenous capabilities;

(c) Development of a core of integrated projects for structural change, with maximum linkage to agriculture and transportation and related to current national project ideas;

(d) Contribution to the development of national, subregional and regional productive capabilities;

(e) Reduction of dependence on external factor inputs;

(f) Recognition of the role of market-widening and raw material sourcing as means of improving the range and level of production;

(g) Induction of changes in the pattern of technical assistance so as to accelerate the reduction of external dependence.

These considerations were seen to facilitate governments' efforts, individually and collectively, in deciding on appropriate courses of action and to assist the three secretariats in implementing the decisions taken by the Ministers of industry.

Incorporating the programme for the Decade in national plans

3. Since all countries have already drawn up their own development plans, their realignment with the objectives, ideas and concepts of the Industrial Development Decade; in whole or in part, will depend entirely on local conditions. Consequently the steps leading to the incorporation of the programme for Decade in national plans described below is only indicative and subject to change:

(a) Step 1: Examination of the existing national development plan in the light of the concepts, objectives and priorities of the programme for the Industrial Development Decade with a view to identifying gaps and formulating alternative proposals;

(b) Step 2: Examination, analysis and evaluation of the existing national industrial and economic structure, its inter- and intra-sectoral relationships, taking into account the operational efficiency of existing industries and the product lines essential for the satisfaction of basic needs, and inter-related factor inputs;

(c) Step 3: Review and assessment of existing industrial projects, including national project ideas and on-going projects, as well as existing production facilities and capabilities.

I. PRIORITIES FOR PREPARATORY PHASE 1982-1984

The need to focus efforts

4. The programme for the Industrial Development Decade for Africa (1980-1990) was the first major step in implementing the chapter in the Lagos Plan of Action devoted to industry.^{1/} The programme covers the following subsectors: food processing, textiles, forest-based industries, building materials and construction industries, metallurgical industries (with special emphasis on iron and steel, aluminium, copper, lead, zinc and tin), chemicals (with special emphasis on ammonia, nitrogenous fertilizers, potash fertilizers, pharmaceutical ingredients, traditional medicine, and biomass-based chemicals), engineering industries (mechanical, non-electrical and transport equipment, agricultural implements, machine tools, foundry and forging facilities), small-scale industries, major factor inputs and raw materials.

5. Since resources are generally too scarce to be spread over all the industrial subsectors and no country is so endowed with natural resources, finance and capabilities that it can cover each priority, it is essential that some development focus be set. It is all the more essential at a time when the deepening international economic crisis threatens the survival of African countries. The increasingly unsettled international economic situation has aggravated the meagre existence of the African peoples, and five persistent major economic crises loom menacingly over the region: those of food, energy, balance of payments, external debt burden and poor management. Furthermore, excessive dependence on external factor inputs and other goods and services only serves to heighten the balance of payments crisis and contribute to the underutilization of capacities in the region.

6. Given the current national and international crises and each country's inability to be fully self-sufficient, it would be impractical for any country to launch into a wide range of industrial activities, irrespective of the strategic significance of such expansion. Thus, in order to avoid falling prey to unsustainable industrial commitments, each country should:

(a) evaluate the need to focus resources on priority and core projects;

(b) appraise existing production facilities, particularly those suffering from excessive underutilization of capacities, with a view to releasing resources from non-strategic industries so as to revive those that have linkages with the core industries appropriate to the country; and

^{1/} OAU, Lagos Plan of Action for the Economic Development of Africa, 1980-2000, paras 50-75.

(c) make efforts to collaborate with other developing countries, at least those in Africa.

Choice of priorities for the preparatory phase (1982-1984)

7. The choice of priorities should take into account (i) the full range of the programme for the Decade (ii) the guidelines for the preparatory phase set by the Sixth Conference and related considerations, and (iii) the need to concentrate on resources in those subsectors that can serve as the engine for industrial development. Moreover, the choice of initial activities at the national level be governed by resource endowment, domestic market, economic co-operation arrangements, and the level of development. In summary, the general criteria governing the choice of activities for the period 1982-1984 are as follows:

- (i) the need to lay a solid foundation for self-reliant development;
- (ii) the need to choose coherent but internally integrated packages of programmes based on available raw materials (resource-based and engineering cores as a basis for specialization, taking into account the resource constraint);
- (iii) the need to develop, as soon as possible, domestic capacities to produce inputs required in the priority sectors: food and agriculture, transport and communication, and energy;
- (iv) The need to choose subsectors which are relatively labour intensive, yet at the same time, generate a widening range of demand for skills which can be met by training on the job or through specific training programmes;
- (v) The need to choose subsectors which are carriers of technology so as to facilitate the acquisition, adaptation and development of technology;
- (vi) The need to choose subsectors which can counteract the current and anticipated economic crises by reducing excess capacities in existing plants, and producing spare parts and maintaining equipment in the agriculture and transport sectors;
- (vii) The need to choose priorities in subsectors and product groups which are compatible with domestic markets, suited to industrial joint ventures between African countries, and feasible on account of raw material complementarity;
- (viii) The need to choose engineering capital goods which are capable of being used to produce them, as well as the production of other capital goods,

8. In the chapters below, options in resource-based core industries are described, as are those in the engineering core programme so as to enable Governments to choose core areas appropriate to local conditions. The document is designed as one of

the inputs into the national and subregional workshops which are expected to define and select the relevant resource-based and the engineering cores, whereafter national and subregional investment programmes and projects would be prepared and promoted during the period 1982-1984 on the basis of these programmes and projects specific training, technology, energy and raw material requirements would be calculated for the same period.

II. ENGINEERING BASED CORE PROGRAMME

Production aspects of the Engineering core and priority project areas

(1) Characteristics of the engineering core industry and its relations upto the objectives of the preparatory phase

9. The developmental significance of the engineering core extends far beyond its commercial yield. It makes a specific contribution to the subsystem in that:

- (i) It integrates various intermediate resource-based industries both within the industrial and other economic sectors by virtue of the fact that it produces capital goods, agricultural implements and equipment, and transport and communications goods;
- (ii) It is used for R & D, especially in the production of prototypes, thus contributing to the acquisition, adaptation and development of technology
- (iii) It generates a wide range of skills;
- (iv) It has the capacity to reproduce itself: the equipment and plants are also used to produce the equipment used by the engineering industry itself.

(2) Raw material inputs required for the development of the subsector

10. The basic raw material inputs into the core subsector include the following products derived from the resource-based subsectors:

(i) Steel shapes

- (a) Carbon steel bars and bar shapes: sheets and springs, structural shapes; plates; wire and wire products; tin plate; other shapes;
- (b) Alloy steel (except stainless); bars and other shapes;
- (c) Stainless steel.

(ii) Copper and aluminium shapes

- (a) Copper and copper-based alloys: wires, bare and insulated;

(b) Aluminium and aluminium based-alloy;

(c) Ferrous castings: iron and steel;

(d) Non-ferrous castings.

(3) The main projects comprising the engineering core

11. The most basic core projects comprise the following plants and equipment:

(i) Machine tools: the specific types of equipment covered are defined by the forms of operation: drilling, drill presser; bending, boring mills, jig borer, broaching, grinder, gear hobber, lathes, milling machines, shapers, screw machine, planers, and measuring equipment;

(ii) Foundry: for ferrous and non-ferrous castings;

(iii) Forging equipment: for manufactures of formed shapes;

(iv) Heat-treatment equipment: for hardening and tempering of parts and components;

(v) Machine-shop equipment: for manufacture of parts and components used in assembly and sub-assembly;

(vi) Tool-room equipment: for production of jigs, tools and fixtures, for repair and maintenance;

(vii) Fabrication equipment: for maintenance of articulated and fabricated structures and components;

(viii) Metal-coating equipment: for long-life surface protection of parts and components

12. Some of the major project areas in this subsector are in the production of machine tools and metal-working equipment; cutting tools; jigs, tools and fixtures for tool rooms; foundry and forging equipments. In the short-term, the raw material inputs could be obtained through long-term purchase agreements from African countries with iron and steel, such as Algeria, Egypt, Nigeria and Zimbabwe and imports from the rest of the world. More iron and steel projects are proposed for the long-term period. In those cases where national markets are too small, subregional and multi-country projects are proposed.

(4) Production characteristics and general requirements

13. The engineering core is a subsystem covering the production of relatively small, but complementary equipment needed for machine tool, foundry, forging, heat-treatment, machine shop, tool-room, fabrication and metal-coating facilities. Some of the products may cost as little as \$400.

14. In the case of machine tools, the stages of production are : (i) conception of model; (ii) design of new tools; (iii) prototype production; and (iv) batch production. Other machine tool outputs cover the whole range of capital goods. In the case of foundries and forging, the main products are castings and forged parts for use in the production of different goods. Economies of scale are achieved by spreading the costs : in the case of machine tools this may be achieved by using same design, while in the case of foundries, the same casting's used for long runs.

15. As for the development of skills, those required for the engineering core are typical of the engineering industry as a whole and are transferable to other subsectors.

16. Of particular interest to African countries with limited resources is that greater part of the investment in the engineering core is characterized by a high degree of labour intensity. In the case of machine tools, for example, labour costs are about 37 % of the turnover, while for foundries the labour input per casting is about ten times that required for the production of a ton of sheet steel with raw materials accounting for about 50 % of the cost.

Linkage between the engineering core programme and the production of inputs for food and agriculture and transport and communications

1. Agricultural implements and tools

17. In the Lagos Plan of Action special stress is placed on the need to establish an industrial base which would ensure the integration of the whole economy 1/ by establishing effective mutual linkages between industry and other sectors 2/ in terms of producing inputs for other sectors and for infrastructures. 3/

18. At the current level of industrial development, the major outputs of the core engineering industry would include tools and agriculture tools/implements as well as equipment for transport, communications and energy. In the case of food and agriculture, the output of the core engineering industry would include : (i) hand tools; (ii) manually operated equipment; (iii) animal-drawn equipment; (iv) tractor-drawn equipment, and (v) irrigation equipment as well as food-processing and storage equipment.

19. While the demand for agricultural equipment and implements is determined by the demand for food and other agricultural products, the national food and nutrition policies, the size of domestic markets and export prospects, that same demand determines the commercial capability of the engineering core industries. The demand for specific types of farm inputs depends, inter-alia, on the size of the farms, the price of the equipment relative to the income levels of the farmers, and the appropriateness of the equipment relative to the level of education of the farming community. The design affects the ability of the farmer to use and maintain the equipment. Satisfactory solutions to these matters would facilitate the translation of the latent demand for farm implements into an effective demand. The size of the market is also partly determined by the extent to which the country is able to resist fragmentation of its domestic market through tied aid for farm implements and the degree of standardization. Above all, the existence of a well articulated policy and programme affects the size and structure of the market.

1/ LPA Paras 52 and 56 (a)

2/ LPA Para 64.

3/ LPA para 66 (e).

20. As regards investment in agricultural equipment, it has been estimated that 80 per cent of the African farmers use traditional hand tools, while 15 per cent use animal-drawn equipment and 5 per cent tractors, ^{1/} This represents gross under-investment in African agriculture. Moreover, each year, African countries spend 5 to 10 times more on importing cereals for foodstuffs than on importing the agricultural implement they would need to produce the same amount of foodstuff.

21. In this as in other subsectors, even the poorer African communities are not without some resources: in both urban and rural areas they have small workshops and smithies making and repairing various types of agricultural tools and implements.

2. Transport and communications equipment

22. The requirements of the transport and communications sectors from the engineering core include: trucks, buses, bicycles, rails, waggon, multipurpose transport equipment, railway waggon, trucks and tractor engines and spare parts for maintenance, as well as telephones and radio receivers.

23. Transportation constitutes a fundamental constraint upon both industrial and agricultural development. The demand for transport may account for as much as 25 to 40 per cent of total investments ^{2/} at the low level of development and this is reflected in the structure of imports in the African region.

Table 1

Value of imports of engineering products into Africa

(billions of dollars) (f.o.b.)

	1972	1977	1980
Machinery non-electrical	2.0	7.0	18.0
Electrical machinery	0.9	4.0	3.3
Transport equipment	3.2	11.3	14.6

Source : ECE: Bulletin of Statistics on World Trade in Engineering Products
(various issues)

^{1/} UNIDO, Present situation, prospects and strategic choice for the Development of agricultural machinery in Africa in the context of Lagos Plan of Action. Issue paper No. 1, ID/WG.365.1 of February 1982, presented to the First Regional Consultation on the Agricultural Machinery Industry, Addis Ababa, 5-9 April 1982, pp 6-7.

^{2/} This level is attained if the definition of transport includes railways, inland and coastal shipping, part of the investment in ports, air transport and roads and local motor vehicles, See, for example, Edwin T. Haefele, Editor, Transport and Development Planning, the Brookings Institute, Washington, DC, December 1966.

24. The demand for transport equipment is determined, inter alia, by the investment in food and agricultural products, transport of manufactures, industrial raw materials and energy, urban growth and demand for urban transportation, population density and distribution. The demand for communications is also determined by the overall growth of economic activities, as well as by education and the dissemination of information. As in the case of agricultural tools and implements, inputs into the informal sector (workshops and repair shops for bicycles and motor vehicles) can be acquired with significant advantage.

3. Raw material requirements for the production of agricultural implements and transport and communications equipment

25. The major intermediate goods or raw materials required for the production of agricultural equipment, implements and tools, as well as transport and communications include the following:

(i) Agricultural implements

Cast iron, mild steel, forging quality steel, and spring steel;

(ii) Transport and communications equipment

(a) Cast iron, mild steel, forging quality steel, high carbon steel, spring steel, and case-hardening steel;

(b) Aluminium alloy, copper alloy, lead, zinc, manganese alloy;

(c) Rubber, plastic asbestos, synthetic rubber, and wood.

In addition to imports from the rest of the world, it is strongly recommended that African countries which do not produce these inputs initiate arrangements for long-term purchase agreements with African steel, copper and aluminium producers.

Linkage between the Engineering core programme and resource-based programmes

26. The main input categories required for the upstream processing of natural resources are well known and include (i) fixed costs equipment, transportation, installation of equipment, utilities, building, packing equipment and materials; (ii) operational costs (direct input of the principal raw materials, packaging materials, labour, spare parts, maintenance, utilities, depreciation and capital costs).

27. The variety of equipment required in each subsector and for the processing of a given natural resource depends both on the specific stage in the processing chain, as well as on the specific activity and process. The linkage between the engineering core and the resource-based cores and other resource-based programmes is illustrated below:

(i) The basic raw material for the core assumed to be locally available;

(ii) The inputs required to produce equipment and machinery (mainly specific types of iron and steel, aluminium and copper alloys, rubber and wood);

- (iii) The engineering core industry used to produce the processing equipment, supported by the relevant R & D, indigenous corporate establishment, discriminative effective government policies, control and integration of the relevant domestic market for the relevant equipments.

28. The development of the engineering core is the necessary pre-condition for the production of equipment required by the resource-based core programmes. While the engineering core programme is multipurpose in character and offers a flexible industrial capability, however small, the implementation of specialized resource-based programme calls, *inter alia*, for the development of an effective fund of knowledge on the world market for all equipment and technology used in that specific sector. This task could serve as the main *raison d'être* of national R & D and technological institutions whose tasks are often so diffuse as to reduce their contribution to the economy compared to the resources allocated to them. Moreover, limited-duration contracts for the training of indigenous industrial enterprises in the production of specific equipment, which is the real meaning of the transfer of technology, have to be arranged either with other developing countries or with specific developed countries.

29. The demand aspect of the production of equipment for resource-based programme calls for special attention; this depends on the scope of the national demand for final products, and on access to subregional and regional markets. Adequate knowledge of and development of these markets through policy measures, standardization, sub-contracting arrangements, and joint ventures must therefore assume high priority.

III. RESOURCE-BASED CORE PROGRAMMES

Problems of and prospects for using exports of conventional manufactures as the engine of industrial development

30. In their initial efforts at industrialization, practically all developing countries have chosen the common route of producing, for both domestic and export markets, a range of conventional products : beverages, food, textiles, toys, leather products, clothing, and wood products. These products are popular because:

- (i) They satisfy basic needs in both developing and developed countries. At low incomes the demand is particularly high, the growth elasticities for textiles (1.19) leather products (1.42) and footwear (1.34) are higher in developing countries than in developed countries, while in the case of apparel the relative elasticities are 1.54 as against 1.55; ^{1/}
- (ii) They require modest technological know how and are highly labour-intensive;
- (iii) Basic raw materials are available in most countries or can be imported relatively cheaply;
- (iv) Plant and machinery costs are not very high;
- (v) Management is not difficult, and can be developed relatively easily.

^{1/} Annex 2.

31. At the same time, those factors which facilitate production also weigh against expansion in international and national markets.

- (i) Too many producers and exporters create an over-supply of these products;
- (ii) Owing to their high labour content, these lines of production are relied unvariably heavily protected;
- (iii) Being products which meet basic needs, their prices significantly affect the cost of labour and cost of living.

32. These and other considerations show that these products cannot be, and are no longer, dependable or reliable engines of growth and development, irrespective of any minor preferences or quotas that may be secured from time to time. The essential conclusion is that the production and export of these products should not be relied upon to generate massive resources and fundamental change in the structure of production or to promote self-sustaining industrial development. Notwithstanding the correctness of this assessment, African countries would, non the less, benefit significantly from the continued production for domestic consumption and export of these products as a matter of complementary but not fundamental development strategy. In this context, the current difficulties call for the adoption of a strategy which includes, inter alia, the following elements:

- (i) Increasing the price competitiveness of African textiles, garments, footwear and other leather products;
- (ii) Increasing the quality competitiveness of the same products;
- (iii) Developing effective marketing capability born within Africa and without.

33. In order to achieve the above objectives, steps should be taken by the African countries to : (i) ensure stable supply of the appropriate raw cotton, (ii) create or obtain access, through TCDC, to R & D institutions, dealing with product design, including garment design, (iii) support indigenous companies in the production of these products, (iv) step up specific programmes for the manufacture of textile equipment (as in Egypt); and (v) conclude subregional and regional agreements on fibres, leather products and toys pertaining to trade, production, TCDC and R & D.

Development prospects for the resource-based core programmes

1. Objectives of the resource-based core programmes

34. Within the increasing exploitation of natural resources, it is absolutely necessary to single out one sector for special treatment and specialization so that it can complement the engineering core and drive the whole economy forward. In many cases, African development efforts have suffered from too few resources and efforts being allocated to too many often unrelated programmes.

35. For most African countries, the capacity for upstream processing of raw materials up to and including the production of final goods (which maximizes value added) can only be limited in the initial stages to a few resource-based industries. Such an approach is essential on account of the enormous investment of capital, labour, technology, natural resources required to achieve the desirable breakthrough. A breakthrough in one such specific area would lend the country the essential self-confidence, permit the transfer of productive capacity to other sectors and yield the benefit of the high value-added.

36. The historical division of labour between developing countries and developed countries in regard to mineral resources has centred on the former exporting upprocessed or only partially processed raw materials in order to import manufactures from the latter. For various reasons discussions has recently focused on whether the industrial processing of raw materials should be located in developing or in developed countries, 1/ and several arguments have been advanced in favour of processing in developed countries.

2. The difficulties of locating raw material processing in developing countries

37. Recent literature offers three broad reasons in favour of locating processing facilities in advanced economies: the comparative advantage, the technological environment and the appropriate market and marketing conditions

38. Arguments relating to comparative advantage of the advanced economies stress the significance of capital intensity over labour intensity in most raw material processing operations, and alternation between labour and capital intensity in the processing chain, even for those raw materials which are pre-dominantly labour intensive. Supporting arguments centre on the fact that some of the inputs required may not be tradeable and the problems of imperfections in the factor markets, arising from the transnational corporations (TNCs) control of markets and marketing channels and the relative lack of management and skills in developing countries.

39. In the case of technology, the arguments centre on the non-homogeneity of technology and the conditions of its sale and transfer: in other words, the appropriate technology may not be, and often is not, available to the developing countries. Other issues relate to difficulties of the acquisition of the latest technology often available in advanced countries.

40. The market and marketing argument, which assumes that the markets are invariably located in developed countries, underlines, inter alia, the following :

- (i) Effects of the economies of scale on location;

1/ UNCTAD, "Processing of Primary Products in Developing Countries: Problems and Prospects", April 13, 1976; UNCTC: "Transnational Corporations and the Processing of Raw materials: Impact on Developing Countries", ID/B/209, 21 April 1978 (Submitted to Industrial Development Board of UNIDO Meeting, 10-26 May 1978); P.A. Cornelisse, F. Bishay, S.I. Cohen and P. Terhal, "Agricultural Processing Industries in the International Division of Labour", Journal of Agricultural Economics, Vol XXXII, No.2, May 1981; G.K. Helleiner, "Manufactured Exports from less Developed countries and Multinational Firms", The Economic Journal, Vol. 82 No. 325, March, 1972.

- (ii) The limited growth of domestic markets in developing countries;
- (iii) Transportation problem arising out of market location;
- (iv) Tariff and non-tariff barriers imposed by advanced countries on developing country processed and semi-processed exports, in order to encourage the export of non-processed materials with little or no value added;
- (v) The advantages to be derived from the use of by-products at the sites of processing; and
- (vi) The problem of the principal advanced country markets being controlled by TNCs.

3. The possibilities of overcoming the difficulties of locating selected upstream raw material processing operations in African countries

41. First of all, a distinction must be made between the natural comparative advantages of raw materials and those of labour, capital, technology 1/ and markets, which are and can be deliberately created through the development process itself.

42. In this connexion, the disadvantage to developing countries arising from market access and control, with which the economies of scale issue is linked, no longer applies, since advanced economy markets are not the only major markets. The market for processed industrial raw materials and intermediates has become greatly diversified and widened to include new dynamic markets in the newly industrializing countries (NICs) and markets in other countries including the African countries. This has come about as a result of the import substitution strategy which, by concentrating production on final goods, has over the last decade created a dynamic demand for intermediates and industrial raw materials. This is often reflected in the high import content in production and excess capacities. Thus, unlike traditional export crops of luxury beverages whose demand is still concentrated in advanced countries, a wide range of market opportunities now exists all over the world for intermediate and processed industrial raw materials. 2/

43. As regards processing technologies in developing countries including African countries, it is well known that the majority of processes required have become "standard" and unpatented, and are available in other (more developed) developing countries. The processes are also incorporated in equipment and plants available on the open market. If these opportunities are seized and supplemented by specialized R & D efforts and a determined search for the relevant information, the technological disadvantage can be surmounted.

1/ See table 2.

2/ See for example a discussion of the options in developing countries by W. Arthur Lewis, "The Slowing Down of the Engine of Growth". The American Economic Review, Vol. 70.No.4, Sept. 1980 pp. 555-564.

44. Apart from technology, the other disadvantages are the lack of infrastructures, management skills and capital where capital is understood to cover financial and physical inputs, as well as plant and equipment. Putting forward capital intensity as a reason for locating proceeding operations in advanced countries derives from the relative scarcity of capital in developing countries and its relative abundance and lower cost in advanced countries, as well as the imperfections in the financial and physical capital input markets. The underlying assumptions are that investment is not indigenous, and that both finance and equipment can for the most part only be obtained from the advanced countries. The developments of the last decade, marked by the emergence of OPEC surplus funds and an increasing number of developing countries with equipment production capability, has altered the near monopoly of the advanced countries in these fields. Moreover, most of the NICs and OPEC countries have aimed at diversifying their economies away from a single commodity (oil) to other sectors, and they often secure their industrial raw materials from African countries through third parties. There thus exists a wide opportunity for the mutually advantageous processing of industrial raw materials through such means as joint ventures or buy-back investment arrangements between African countries and those countries 1/.

45. Economic and industrial development consists only partly of the exploitation of natural comparative advantages, but rather more fundamentally of the deliberate creation, through investment, of new advantages and the transformation of partial advantages of natural resources into new combined advantages so as to achieve, in some specific, albeit limited product lines, global advantages in international markets.

1/ Also see Document ECA/FCIA.7/INR/WP/4.

46. In the development context, the advantages required are broader than competitiveness in world markets for few products lines, simply because such an achievement presupposes fundamental, economic, technological and structural change which sustains such competitiveness under changing conditions.

47. Owing to the relatively large investment needed to convert a natural resource advantage into a global advantage through the transformation of technological and productive structure, only a few such choices can be made as to the second engine of development (the other being in the engineering core). If it is to be effective any efficient choice of such resource-based industries must satisfy some predetermined criteria.

Preliminary criteria governing the choice of appropriate resource-based core programmes

48. The resource-based core(s) may be one or more, but the fewer the better for reasons to be discussed below. Owing to the number of estimates, calculations, and assessment required the choice of cores is not a simple matter. The criteria should take into account the following factors:

- (i) Knowledge of intermediate and final products which can be produced with specific resources. 1/
(ii) Natural resource availability. The quantity and quality of the basic natural resource available determine the stability and strength of the basic strategy; the more resources, the better.

1/ Some of the major industrial raw material categories in the African region include:

- | | | |
|-------------------------|------------------------------|-----------------------------|
| (1) <u>Food</u> | (2) <u>Forest Resources</u> | (3) <u>Raw cotton</u> |
| cereals | e.g. most African | |
| tubers | <u>timber</u> | (4) <u>Non-ferrous ores</u> |
| meat | Azobe | copper |
| fish | Emien | lead |
| fruits | Ilombe | zinc |
| sugar | Limbali | bauxite |
| hides and skins | Makore | tin |
| animal and vegetable | Sipo | magnesium |
| products | | |
| (5) <u>Ferrous ores</u> | (6) <u>Chemical minerals</u> | |
| iron | phosphates | pyrethrum |
| cobalt | potash | animal by-products |
| nickel | salt | coal |
| manganese | sulphur | limestone |
| chromium | petroleum | sand |
| | natural gas | bauxite |
| | medicinal plants | cement |
| | cereals | wood |

- (iii) The relative contribution of the natural resources and local labour to total cost. The relative distribution of production costs among the various inputs indicates the relative level of domestic value added. The higher the rate, the more preferable it is.
- (iv) The availability of complementary natural resource inputs. The assessment of alternative sources and sourcing prospects, conditions and stability of supply is essential: the larger and more stable the sources, the more preferable.
- (v) The relative share of the cost of capital equipment and technology. This measure - indicates capital and technological intensity of production. It represents the advantage to be acquired at a cost through policy measures, organization, incentives, resource concentration, search of information, and investment.
- (vi) Character of technology: This refers to technological continuity and technological transferability. It is identified in relation to the special resources under consideration. The questions that arise are: is the level of technology required to develop the resource so high that it cannot be undertaken even using all available skills and capacities, or is it possible to start with limited adjustments of the skills and technology available? How is the technology expected to develop? To what extent is the technology transferable (perhaps directly or with limited adaptation) to other priority sectors? The more transferable the technology and the greater its continuity, the better.
- (vii) The relative significance and special dynamics of the constituent markets: The relative importance of the four constituent markets must be evaluated: (1) domestic ^{1/} (ii) the subregional/regional; (iii) markets in other developing countries; (iv) markets in advanced countries. The evaluation would take account of current relative sizes as well as the dynamics of and future trends of demand in these markets; the economic viability of the strategy depends on these considerations. If the programme depends fundamentally on the markets of advanced economies, its viability will be doubtful owing to the market control and power of monopolistic transnational corporations, and problems arising from tariff barriers competition and protection. At the same time, fuller penetration of these markets must await greater competitive capacity through "learning by doing", a higher share of domestic market priorities, as well as technological adaptation, product design and development based on actual interaction with users before effective movement into other markets.
- (viii) The difference between the value of unprocessed and semi-processed raw material and that of the final product. This is a general measure in financial return terms, of the advantages of investment in upstream processing to final goods.
- (ix) The level of development in the core engineering industry. This reveals part of the investment cost to be incurred in order to initiate the change in comparative advantage because it is this subsector which bears the main burden of acquiring and adapting technology, as well as manufacturing equipment which was initially imported for use in the subsector.

^{1/} Taking into account domestic demand for raw materials inputs with a view to reducing excess capacities in existing industries most of which depend excessively or imported inputs.

(x) The special resource endowment. These resources which are often overlooked and are often more decisive than material resources, include: behavioural resources, such as the solidarity of the community, as reflected in incentives and work effort; special aptitudes; work discipline; organizational structures; and the traditional art of craftsmanship.

(xi) The capacity of the subsector to act as lead subsector. This leadership is viewed not only from the standpoint of income generation, exports and employment, but also in terms of the capability to generate internal demand and supply.

49. The implementation of the priority resource-based core calls for a form of treatment different from other industrial activities in terms of: allocation of financial resources, capital, policy measures, information, incentives, R & D and concentration and rationalization of indigenous corporate resources. Only in this way can the strategy yield the desired results and serve as the complementary engine to the engineering core.

Demand Prospects for the Resource-based programmes

50. Annexes 1 - 6 show growth and size elasticities for 19 industrial branches and four country groups. 1/ Size elasticities for food products, (see Annex I) indicate that in small countries with ample resources and an industrial orientation this branch would benefit from enlarging the size of the domestic market, while in the other three country groups, the size elasticities are negative, i.e. increases in output are less than proportional to increases in market size and the per-capita output will decline.

51. The size elasticities for clothing and related products (see annex 2) are negative, in most cases in particular for large countries. Market size is more important for textiles, leather and fur products on small countries with modest resources. Regarding growth elasticities, all the four branches of clothing show high growth elasticities for large countries and in particular for small countries with ample resources and a primary orientation. One of the reasons for low growth elasticities for small countries with ample resources and an industrial orientation for textiles, footwear, leather and fur products is the high level of specialization with limited market segments.

52. On the other hand, size elasticities for wood and related products (see Annex 3) show that market size for small countries with ample resources and an industrial orientation is important especially for paper, wood and cork products. In small countries with modest resources, market size is important for furniture and fixtures, whereas for small countries with ample resources and a primary orientation, market size is more important for paper. The growth elasticities are relatively high for all wood and related products, in particular for small countries with ample resources and a primary orientation. This reflects the export orientation of new production capacity in these countries.

-
- 1/ Group I contains 25 countries
 Group II contains 34 countries
 Group III contains 17 countries
 Group IV contains 30 countries

Source: UNIDO, World Industry since 1960: Progress and Prospects, UN Publication Sales No.: E. 79, II. B.3, pages 359-360.

Table 2: Approximate shares of labour, capital and raw material in total production costs for resource-based industries

(percentage)

Industry	Raw Material	Value added	
		Labour	Capital
Copper refined (ore input)	60	.	.
Aluminium (input)			
Aluminium (bauxite)	24	10	40
Aluminium ingots (alumina)	28	13	30
(bauxite)	7	16	41
Semi-fabricated products			
(aluminium)	43	21	15
(bauxite)	3	28	32
Steel (input)			
Pig iron (ore, coal)	55-74	2-4	19-30
Crude steel			
(pig iron)	65-74	2-5	10-13
(ore, coal)	36-55	3-7	24-34
Rolled steel			
(crude steel)	55-74	1-4	17-38
(ore, coal)	21-30	3-8	40-50
Ammonia (natural gas)	22-43	2-6	41-46
Wood products (timber)			
Sawmills	32	18	12
Plywood	31	10-16	12-23
Pulp/paper	26	4-6	30-34
Leather (input)			
Corrected grain			
Leather (raw hides)	56	9-18	11-17
Quality welted shoes			
(leather uppers, soles, etc)	48	5-18	22

Source: UNIDO, Industrial Processing of Raw Materials, UNIDO/ICIS, 126 of Nov. 1979, Table 2, pp. 31-32

53. For chemical and related products (see Annex 4) size and growth elasticities are relatively high for small countries with modest resources (especially chemicals and plastic products) while in small countries with ample resources and a primary orientation, growth elasticities are high for industrial chemicals.

54. Basic metals and related products (see Annex 5) also show high growth and size elasticities for all the four country groups and especially for small countries with ample resources and a primary orientation, and small countries with ample resources and an industrial orientation.

55. Fabricated metal products, machinery and equipment, (see Annex 6) show relatively high growth and size elasticities for most of the products, with the exception of transport equipment, in small countries with modest resources and for non-electrical machinery in small countries with ample resources and a primary orientation.

56. In general, growth and size elasticities are high for heavy industry, chemicals, engineering goods and capital equipment. This holds true for small countries with ample resources and a primary orientation and small countries with ample resources and an industrial orientation.

IV. BRIEF SUMMARY OF SOME OF THE PRIORITY ACTIONS, PROJECT IDEAS AND PROJECT PROPOSALS FOR ACTION AT NATIONAL AND/OR SUBREGIONAL AND REGIONAL LEVELS

Incorporation of the Programme for the Industrial Development Decade for Africa in national plans and choice of core programme (1982-1984)

57. The new perception of latent opportunities and the need to choose domestic engines of industrial development, on which resources and efforts will be concentrated, will entail complementarities of actions, projects, and programme management measures. Although these complementarities would vary from country to country, the major elements would be:

- (i) Determination of the potential resource base and related advantages, and identification of the various product lines and by-products connected with the resources;
- (ii) Assessment of potential possibilities and costs (see for example, the elements of the criteria indicated above);
- (ii) Formulation of a coherent and complementarity programme(s) based on the engineering and resource-based cores, and determination of labour, technological and institutional requirements, including R & D, and project preparation capabilities;
- (iv) Support and where necessary, creation of corporate institutions, such as companies responsible for the organization of production and distribution in core programmes;
- (v) Programming of domestic production of spare parts, components and equipment required as inputs into the core programmes;

- (vi) In co-operation with other countries, identification and formulation of a subregional programme to ensure the supply of complementary inputs, material, and services, and access to markets.

58. Guidelines have been prepared on the organization of national workshops with a view to adjusting national industrial programmes in keeping with the programme for the Decade. 1/

Indicative project ideas

59. The following activities and project ideas derived from the preceding chapters are neither comprehensive nor complete, but serve merely as an indication of possibilities in the preparatory phase (1982-1984):

Traditional manufactures: textile, leather and wood products

- (i) Consultations leading to the conclusion of subregional and regional textile and related fibres agreements covering co-operation in trade, raw materials, manufacturing and R & D;
- (ii) Consultations leading to the conclusion of subregional and regional agreements on leather and leather products, covering co-operation in raw materials, trade, production and R & D;
- (iii) Consultations leading to subregional and regional agreements on the co-operation in the production and trade of toys;
- (iv) Consultations leading to subregional and regional collaboration in the wood-working industries;
- (v) Initiation of projects on the maintenance, production of spare parts and the production of textile and leather-processing and wood-working equipment.

Engineering core programme

- (i) Foundry incorporating casting and related facilities;
- (ii) Forging and heat-treatment facilities;
- (iii) Machine shops;
- (iv) Metal fabrication facilities;

1/ See document entitled "Guidelines for Initiating Priority Actions on National and Subregional Levels (1982-1984) for the Implementation of the Industrial Development Decade for Africa (IDDA)" reference no. ECA/FCIA.7/INR/WP/3.

(v) Tool room shops;

(vi) Metal-coating facilities;

(vii) Manufacture of machine tools and metal-working machines.

Agricultural implement, transport and communications equipment

(i) Manufacture of agricultural tools and implements: hand tools, animal-drawn implements, irrigation equipment, power operated equipment and food-processing equipment. Wide scope exists for national actions and co-operation;

(ii) Manufacture of bicycles. Wide scope exists for national and subregional actions, especially in subcontracting the production of parts and components;

(iii) Manufacture of transport equipment: motor vehicles (including multipurpose transport equipment) and rolling stock. Wide scope exists for action at the national, subregional and regional levels and technical collaboration.

Resource-based programmes

60. The main natural resources include: food and agricultural products; animal resources; forest resources; marine resources; metal and non-metal deposits; and energy. Owing to the wide range of possible subsectoral programme and projects, only indicative projects in metals and chemicals are listed below which call for large economies of scale and the outputs of which are required as inputs in nearly all countries. Other resource-based core programmes depend on national resource endowment and local conditions. As in the previous sections, these project ideas relate to the period 1982-1984.

Metal-based projects

(i) Promotion of long-term purchase agreements between African iron and steel producers and other African countries and, wherever possible, share equity in current national iron and steel projects; establishment of rolling mills in non-primary iron and steel producing countries;

(ii) Identification and promotion of iron and steel projects;

(iii) Manufacture of copper, aluminium and alloy products;

Chemical-based projects

- (i) Promotion of long-term purchase agreements and/or share equity and other forms of participation by other countries in national fertilizer project in Ethiopia, Nigeria, Tanzania and Togo;
- (ii) Identification and promotion of other subregional fertilizer projects;
- (iii) Identification and promotion of subregional projects for the production of active pharmaceutical ingredients on the basis of WHO essential drugs list;
- (iv) Identification and promotion of the methods of commercialising pharmaceutical research findings based on traditional medicinal plants;
- (v) Identification and promotion of subregional projects for the production of active pesticide ingredients.

Building materials

- (i) Promoting increased production of cement particularly in the western and central African subregions to overcome deficit;
- (ii) Promoting the production and utilization of alternate building materials like lime and pozzolana through the establishment of pilot plant cum demonstration projects in selected locations;
- (iii) Establishment of subregional building and building materials research centres;
- (iv) Publication of directories on African building and building materials research organizations and on African building and building materials research scientists and technologists;
- (v) Creation of "Nodal mechanisms" at national level and "Development Councils" at subregional level within existing governmental machinery to enable co-ordinated planning and implementation of the development programmes for building materials.

Actions at subregional and regional levels

61. The significance of industrial co-operation in the implementation of the programme for the Industrial Development Decade and the form of such co-operation are dealt with in another document. 1/ This notwithstanding, implementation of the above activities will call for different types of activities, consultations, negotiations, formulation of joint programmes, and investment promotion at sub-regional levels. Many of these activities are expected to emerge from the national projects with multinational components and from projects with large economies of scale are of priority interest two or more countries. Such projects will be integrated into subregional programmes in response to the needs of intergovernmental organizations, including the MULPOCs.

V. IMPLEMENTATION OF PRIORITY PROGRAMMES

The Role of small-scale, medium-sized and large-scale industrial projects

62. Although defined variously in different economies, the categorization of industrial production into small-scale, medium-sized and large-scale industries is none the less frequently used as a basis for industrial development strategies and planning. 2/

63. These concepts need to be re-examined in the light of the strategy proposed for 1982-1984, since no viable development is likely to occur without the integrated development of the three or four categories of industrial production. It is to be recalled that the definition of small-scale, medium-sized and large-scale industries derives from the size of the market, capital investment, operational costs and development. However, industrial operations may be small-scale. Yet capital- and technology-intensive. Moreover, the establishment of a wide range of heterogeneous small-scale industries without taking into account the raw material supply and the possibility of replacing equipment by domestic production would create problems of excess capacity and high production costs due to the import content, maintenance and spare parts that are common to medium-sized and large-scale industries. The larger enterprises can often afford to support their own preventive repair and maintenance facilities, while isolated small-scale industries are vulnerable.

64. The essential principle is that of domestic integration and complementarities within each of the three categories, as well as between the three categories since some operations can be more efficiently undertaken at different scales of production. For example, the national and international marketing of final products, the procurement of industrial raw materials, and R & D can be more efficiently handled by large-scale trade and production enterprises. In the implementation of the special priority core programmes related to the IDDA as distinct from other aspects of

1/ See document entitled "Review of Modalities for the Implementation of the Decade Programme at Subregional and Regional Levels", reference ECA/FCIA.7/INR/WP/4 of 24 August, 1982.

2/ See Annexes 1 - 6.

the industrial programmes, it is essential to determine those stages in the production of specific product lines that could be carried out more efficiently by large-scale, medium-sized, small-scale plants or even craftshops. Wherever possible, one should also determine which elements of the markets are more appropriate to the different enterprise categories so that the total national efforts are complementary.

Inter-disciplinary needs and project preparation capabilities

65. In some cases, the minimum capability required to initiate the core programmes may be obtained by upgrading and strengthening existing institutions or creating new ones. The need for an intersectoral and interdisciplinary approach in the course of programming and executing the core industries 1/ cannot be overemphasized. Equally fundamental is the development of essential national capacities in such areas as: (i) project preparation services for undertaking feasibility studies; project monitoring and evaluation; technical training and management consultancy; (ii) procurement, finance and marketing services for machinery and raw materials; (iii) product development and design services, including standardization and product adaptation; and (iv) technological and engineering advisory services related to plant layout, process planning, equipment selection, production and quality control, material control and inspection.

Development of the capabilities of indigenous agents of production and distribution and other key factor inputs

66. The implementation of the industrial core programme will depend largely on the goals, behaviour and capacities of the agents of production and distribution (which in the region comprise indigenous private, state and foreign enterprises), and the incentives offered to them 2/. Hence, depending on domestic conditions and utilizing the relevant experience of other third world countries, it is recommended that incentives and other measures be taken to enable indigenous industrial entrepreneurs to produce the products related to the core industries identified. Effective actions by such entrepreneurs must begin with their participation in the formulation of the programmes.

67. The importance of the "core" as an organizing framework is that it permits the concentration of resources in maximum impact areas from which a break through facilitates the transfer of skills and experience to other sectors. It facilitates the derivation of manpower and technological programmes from specific product priority lines and programmes rather than from generalized needs. It would for example enable the African countries to derive specific technological and design benefits from the

1/ See "Guidelines for initiating priority actions at the national and subregional levels, 1982-1984", Section IV, reference ECA/FCIA.7/INR/WP/3 of 21 July 1982.

2/ See "Implementation of the Lagos Plan of Action", E/ECA/FSD.2/12 Rev.1 of 18 April 1982, para. 106.

African Regional Centre for Technology (ARCT) located in Dakar, Senegal, and the African Regional Centre for Engineering Design and Manufacturing (ARCEDEM) located in Ibadan, Nigeria, and the African Institute for Higher Technical Training and Research (AIHTTR), in Nairobi, Kenya and other regional facilities.

Collective capability for implementing the core programmes

68. Both at the stage of integrating the national priority projects into core programmes, 1/ as well as in the assessment of national capabilities, the need for collective action will reveal itself. Indeed, some of the major national objectives can only be realized within a multi-country context, in view of their input requirements and scale of production. The need for co-operation calls for the creation of national facilities to promote intra-African co-operation. However, the type of industrial co-operation between member States depends upon the nature of activities involved in each case. At the subregional and regional levels, it has been imperative to give attention to the formulation of coherent programmes based on projects which require large markets and wide complements of inputs and national projects with multinational components. In order to implement these programmes and promote industrial co-operation in other areas, the establishment of intra-African investment systems is proposed for the mobilization and redeployment of financial resources for developing/establishing multinational strategic industries. 2/

Activities of the secretariats of OAU, ECA and UNIDO and other United Nations agencies supporting Governments in the implementation of the programme during the preparatory phase

69. Although the African countries, individually and collectively, are expected to bear the main responsibility for the implementation of the programme in the spirit of individual and collective self reliance, it is also assumed that increasing support will continue to come from the international community and international organizations.

70. During the period 1982-1984 and extending into 1985, the secretariats of the three Organizations will continue to provide support to Governments, individually and collectively, in such areas as: formulation of strategies, and sectoral and subsectoral planning and programming; institutional development; development of the requisite labour capabilities; assessment and identification of industrial raw material resources so as to facilitate complementarities; technology; mobilization of financial resources for industry projects; support of industrial institutions; promotion of intra-African industrial co-operation; popularization of the Decade; and supply of industrial information.

1/ See "Guidelines" ECA/FCIA.7/INR/WP/3, Part III, B2.

2/ For more discussion of this issue see "Review of modalities for the implementation of the Decade Programme at subregional and regional levels", ECA/FCIA.7/INR/WP/4.

71. Technical assistance will also continue to be provided in the identification of projects which may be based on the major natural resources available in the African region to assist Governments in the choice of core programmes. Project profiles for the engineering core programmes will be prepared. Preinvestment activities and investment promotion will be undertaken, while consultations and negotiations on programmes, project promotion and TCDC, at both regional and subregional levels, will be organized on the basis of the specific requests and needs. Assistance will also be given in the form of technical support to national planning expert groups and workshops for incorporating the Decade Programme in national plans as well as in follow-up actions and the formulation of subregional programmes and plans in the context of intergovernmental organizations.

72. The three secretariats will also, individually and jointly, seek the support of other United Nations agencies. Efforts in this direction were initiated in March 1982 by the convening of an inter-agency meeting at UNIDO Headquarters in Vienna. In particular, support has been sought from, and in principle promised by, the UNDP in the form of funding a significant set of activities during the preparatory phase.

Growth and size elasticities for Food Products, 1969-1973

(Elasticity coefficient)*

Country category \ Branch	Food Products	
	ISIC Growth	311 size
1. Large countries (a)	1.07	-0.11
2. ^{i/} Small countries with modest resources (n)	0.54	-0.45
3. ^{i/} Small countries with ample resources and a primary orientation (c)	1.46	-0.10
4.m Small countries with ample resources and industrial orientation (d)	0.77	0.17

Source: World Industry since 1960: Progress and Prospects, UNIDO, New York, 1979

* The equation for the regression analysis had the form in $(V/N) = a + b \ln Y + c \ln N$, where V is value added in millions of 1970 dollars, Y is per capita GDP and N is population in millions. Data includes that for both developing and developed market economies.

- (a) Number of countries = 25 (3 of them African)
- (b) Number of countries = 34 (25 of them African)
- (c) Number of countries = 17 (7 of them African)
- (d) Number of countries = 31 (6 of them African)

^{i/} Most African countries belong to these two categories.

Growth and size elasticities for clothing and related products, 1969-1973

(Elasticity coefficient)*

Country category \ Branch	clothing and related products							
	Textiles		Wearing apparel		Leather & fur products		Footwear	
	ISIC Growth	321 Size	ISIC Growth	322 Size	ISIC Growth	323 Size	ISIC Growth	324 Size
1. Large countries (a)	1.02	-0.04	1.55	-0.59	1.15	-0.28	1.14	-0.57
2 ^{i/} Small countries with modest resources (b)	0.99	0.63	1.05	-0.20	0.96	0.43	0.70	-0.29
3 ^{i/} Small countries with ample resources and a primary orientation (c)	1.19	0.33	1.54	-0.23	1.42	-0.22	1.34	-0.19
4. Small countries with ample resources and an industrial orientation (d)	0.98	0.11	1.43	-0.13	0.92	-0.06	0.87	-0.15

Source: World Industry since 1960: Progress and Prospects, UNIDO, New York, 1979

* The equation for the regression analysis had the form in $(V/N) = a + b \ln Y + c \ln N$ where V is value added in millions of 1970 dollars, Y is per capita GDP and N is population in millions. Data includes that for both developing and developed market economies.

- (a) Number of countries = 25 (3 of them African)
- (b) Number of countries = 34 (25 of them African)
- (c) Number of countries = 17 (7 of them African)
- (d) Number of countries = 31 (6 of them African)

^{i/} Most African countries belong to these two categories.

Growth and asize elasticities for Wood and related products, 1969-1973

(Elasticity coefficient) *

Country category \ Branch	Wood and related products							
	Wood and cork products		Furniture and fixtures		Paper		Printing and publishing	
	ISIC	311	ISIC	322	ISIC	341	ISIC	342
	Growth	Size	Growth	Size	Growth	Size	Growth	Size
1. Large countries (a)	1.19	-0.31	1.57	-0.23	1.77	-0.17	1.50	-0.17
2 ^{i/} Small countries with modest resources (b)	0.93	-0.16	1.04	0.24	1.54	0.12	1.32	-0.23
3 ^{i/} Small countries with ample resources and a primary orientation (c)	1.79	0.05	1.66	-0.28	1.84	0.22	1.90	-0.03
4. Small countries with ample resources and an industrial orientation (d)	1.48	0.22	1.47	-0.26	1.72	0.45	1.58	0.01

Source: World Industry since 1960: Progress and Prospects, UNIDO, New York, 1979

* The equation for the regression analysis had the form in $(V/N) = a + b \ln Y + C \ln N$ where V is value added in millions of 1970 dollars, Y is per capita GDP and N is population in millions. Data includes that for both developing and developed market economies.

- (a) Number of countries = 25 (3 of them African)
- (b) Number of countries = 34 (25 of them African)
- (c) Number of countries = 17 (7 of them African)
- (d) Number of countries = 31 (6 of them African)

i/ Most African countries belong to these two categories.

Growth and size elasticities for chemicals and related products, 1969-1973 (Elasticity coefficient)*

Country category	Branch	Chemicals and related products							
		Industrial chemicals		Other chemicals		Rubber products		Plastic products	
		ISIC Growth	351 Size	ISIC Growth	352 Size	ISIC Growth	355 Size	ISIC Growth	356 Size
1.	Large countries (a)	1.67	0.18	1.35	0.10	1.22	0.27	1.49	-0.12
2. ^{i/}	Small countries with modest resources (b)	1.44	-0.01	2.36	1.22	1.71	0.43	2.13	0.27
3. ^{i/}	Small countries with ample resources and a primary orientation (c)	2.06	0.61	1.55	0.11	1.41	0.25	1.85	0.17
4.	Small countries with ample resources and an industrial orientation (d)	1.82	0.09	1.07	0.16	1.24	-0.02	1.28	-0.34

Source: World Industry since 1960: Progress and Prospects, UNIDO, New York, 1979.

* The equation for the regression analysis had the form in $(V/N) = a + b \ln Y + C \ln N$, where V is value added in millions of 1970 dollars, Y is per capita GDP and N is population in millions. Data includes that for both developing and developed market economies.

- (a) Number of countries = 25 (3 of them African)
- (b) " " " 34 (25 of them African)
- (c) " " " 17 (7 of them African)
- (d) " " " 31 (6 of them African)

^{i/} Most African countries belong to these two categories.

Growth and size elasticities for basic metals and related products, 1969-1973

(Elasticity coefficient) *

Branch Country category	Basic metals and related products					
	Iron and steel		Non-ferrous metals		Metal products excluding machinery	
	ISIC	371	ISIC	372	ISIC	381
	Growth	Size	Growth	Size	Growth	Size
1. Large countries (a)	1.81	0.27	1.44	0.09	1.48	-0.15
2. ^{i/} Small countries with modest resources (b)	2.09	-0.04	1.23	-0.07	1.36	0.20
3. ^{i/} Small countries with ample resources and a primary orientation (c)	2.40	0.21	2.89	0.56	1.65	-0.18
4. Small countries with ample resources and an industrial orientation (d)	2.16	0.31	2.10	1.00	1.53	0.21

Source : World Industry since 1960: Progress and Prospects, UNIDO, New York, 1979

* The equation for the regression analysis had the form in $(V/N) = a + b \ln V + C \ln N$, where V is value added in millions of 1970 dollars, Y is per capita GDP and N is population in millions. Data includes that for both developing and developed market economies.

(a) Number of countries = 25 (3 of them African)

(b) " " " " 34 (25 of them African)

(c) " " " " 17 (7 of them African)

(d) " " " " 31 (6 of them African)

^{i/} Most African countries belong to these two categories.

Growth and size elasticities for fabricated metal products, machinery and equipment, 1969-1973 (Elasticity coefficient)*

Branch Country category	Fabricated Metal products, machinery and equipment					
	Non-electrical machinery		Electrical machinery		Transport equipment	
	ISIC	382	ISIC	383	ISIC	384
	Growth	Size	Growth	Size	Growth	Size
1. Large countries (a)	2.05	0.40	1.77	0.11	1.86	0.25
2. ^{1/} Small countries with modest resources (b)	1.98	0.44	2.28	0.10	1.60	-0.52
3. ^{i/} Small countries with ample resources and a primary orientation (c)	2.43	-0.17	2.30	0.40	2.37	0.34
4. Small countries with ample resources and an industrial orientation (d)	2.34	0.18	1.78	0.34	1.85	0.29

Source: World Industry since 1960: Progress and Prospects, UNIDO, New York, 1979

* The equation for the regression analysis had the form in $(V/N) = a + b \ln Y + C \ln N$, where V is value added in millions of 1970 dollars, Y is per capita GDA and N is population in millions. Data includes that for both developing and developed market economies.

(a) Number of countries = 25 (3 of them African)

(b) " " " " 34 (25 of them African)

(c) " " " " 17 (7 of them African)

(d) " " " " 31 (6 of them African)

^{i/} Most African countries belong to these two categories.